HANDBOOK OF ALASKA

BY

MAJ. GEN. A.W. GREELY, U.S.A.

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HANDBOOK OF ALASKA

The Giant Moose.

(The largest mammal in North America.)

From painting in possession of Biological Survey, U. S. Department of Agriculture.

HANDBOOK OF ALASKA

ITS RESOURCES, PRODUCTS, AND ATTRACTIONS

BY

MAJOR-GENERAL A. W. GREELY, U. S. A.

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SHERMAN, TEXAS

New Edition

WITH PREFATORY CHAPTER ON ALASKA IN 1914 AND A MAP SHOWING PROPOSED RAILWAY ROUTES

Illustrated

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PREFACE

FORTY years have passed since the foresight and negotiations of a great statesman, William H. Seward, added to our national domain the immense and valuable Territory of Alaska. It has contributed to our public wealth products worth more than three hundred millions of dollars, yet to this day it is a terra incognita to the American public. Not only is the ordinary man of affairs ignorant of the general features of Alaska, but this is also true of the usually well-informed. Indeed, in a widely circulated and standard work of geographic reference the errors relative to the Territory are simply astounding in number as well as in character.

The great economic value of the more northern parts of North America is being gradually recognized, as indicated by the rapidly increasing wealth of northwestern Canada, and by the construction of the transcontinental Grand Trunk Railway with its terminus at the southeastern boundary of Alaska.

For the first time an organized effort has been made to draw public attention to the products and resources of Alaska, through their adequate and material presentation in the Alaska-Yukon Exposition at Seattle.

The need has long been obvious of a Handbook that should assemble widely scattered and reliable Alaskan data of current interest. In attempting this task, the aim of the author looks to a clear, brief summary of

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such definite and accurate information as may be of interest to the student or of value to the man of action. There are herein presented such phases of Alaskan affairs as may concern those interested in the development of the country, for those who plan Alaskan journeys for business, pleasure, or research, as well as for those who have in view commercial ventures or contemplate permanent residence.

That Alaska now presents economic conditions of current and growing importance is evidenced by her average imports from the United States, which approximate $18,000,000 annually, more than triple in value those of the Philippines. Moreover, Alaskan products since 1905 have yearly exceeded $31,500,000, and indications point to a large increase in the immediate future.

While touching briefly such topics, yet this volume does not attempt to narrate the history of Alaska, to depict fully the virile and stirring life of its placer miners, or to describe in detail its varied and remarkable scenery, which equals or surpasses the combined charms of the Norwegian fiords and the Swiss Alps.

The topical method has been followed as best suited adequately to treat so extensive a region of greatly varied conditions. The chapters on glaciers, volcanoes, game, and various mining districts are based on reports of the ablest and best-informed Alaskan investigators. Acknowledgments are hereby made to the authors of publications, whose titles follow each chapter for the benefit of readers who desire fuller information on special subjects under consideration.

While relying largely on the reports of experts, the

author draws on his own extended experiences and knowledge in cases of conflicting or insufficient data. Twice he has exercised supreme military command over Alaska, and under his control and supervision was built the Alaskan military telegraph system—over 4,000 miles of land lines, submarine cables, and wireless. In six visits to Alaska he has thrice traversed the whole Yukon Valley, visited Fairbanks and Prince William Sound twice, and Nome three times.

Familiar with Alaska for the past nine years, he has seen its evolution from a few mining centres without civil law to its present status of an organized Territory, with railways, cables, schools, and all the concomitants of a great and prosperous country.

A. W. Greely.

Washington, D. C., *May*, 1909.

PREFACE TO NEW EDITION

Such great and radical changes have occurred in Alaska since the appearance of this Handbook of Alaska, that at least brief consideration must be given them in a new edition. In this transitory period of the development of the Territory it appears inadvisable to revise this work until Congress has definitely acted with reference to the vitally important subjects of transportation and of coal deposits.

The prefatory chapter which has been added in this edition treats of all important changes from 1909 to 1914, including the change in the form of government, development of mining industries, growth of fishing interests, regulation of the fur-seal trade, extension of roads, renewal of volcanic activities, investigation of glacial condition, mountaineering triumphs, etc. In connection with the appropriation of $40,000,000 for government railways, contemplated by the bill which passed the Senate on January 24, 1914, there has been added a map showing Railway Routes considered by the Alaska Railway Commission and submitted to Congress by the President in February, 1913.

The vast importance of Alaska to the economic development of the United States is shown by its contributions, apart from local consumption, to the country at large. These contributions in the shape of furs, fish, and metals somewhat exceeds the enormous sum of $500,000,000.

A. W. Greely.

Washington, D. C., *February*, 1914.

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PREFATORY CHAPTER

ALASKA FROM 1909 TO 1914

CERTAIN changes and advances have taken place in the evolution of Alaska since 1909, which naturally modify the conditions set forth in the original chapters of this volume. Such modifications are herein briefly set forth, under appropriate headings and in the serial order of the chapters, to which references by page are duly made. It is thought that all matters of primary importance have been presented under current conditions.

GOVERNMENT AND LAWS (*Page* 14)

An Act of Congress, of August 24, 1912, created for Alaska a legislative assembly, to consist of eight senators, with terms of four years, and sixteen representatives with terms of two years. Elected in equal numbers from each of the four judicial districts, their eligibility requires that they shall be electors of two years' residence in the district represented. The governor of the Territory has the veto power; the powers of the Legislature are restricted and its sessions are limited in time. All laws enacted are submitted to the Congress of the United States, and if disapproved become void. The expenses of the Legislature are met

by the United States. The first Legislature met in January, 1913, at Juneau, the capital of Alaska.

WATERWAYS, ROADS, AND RAILROADS

Waterways

The development of the placer regions of the Innoko-Iditarod regions has stimulated river transportation on the Kuskokwim River. It is navigable about 650 miles from its mouth to the Forks, 50 miles above the Takotna.

Wagon Roads (*Page* 26)

The Road Commission, under Lieutenant-Colonel W. P. Richardson, United States Army, has pursued its difficult work with great ability, persistency, and success, and the Railway Commission has officially recorded itself as "greatly impressed with the work accomplished by the Road Commissioners."

In recent years the funds available have been as follows: 1910, appropriations, $350,000; 1911, appropriations, $100,000; Alaska Fund,[1] $150,000; 1912, appro-

[1] The Alaska Fund is that authorized by an Act of Congress, of May 14, 1906, which directs "That all moneys derived from and collected for liquor licenses, occupation, or trade licenses, outside of the incorporated towns in the District of Alaska shall . . . be known as the *Alaska Fund*. . . . One-fourth of said fund . . . shall be devoted to . . . the maintenance of public schools in said district; five per cent. of said fund shall be devoted to the care of insane . . . persons in said district; and all the residue (later reduced to sixty-five per cent.) of said fund shall be devoted to the construction of wagon roads, bridges, and trails in said district."

priations, $150,000; Alaska Fund, $152,000; 1913, appropriations, $125,000; Alaska Fund, $228,000. The total appropriations by Congress, to June 30, 1913, amount to $1,375,000, while the Alaska Fund has yielded $1,160,829.63. The construction to that date is as follows: wagon road, 862 miles; winter sled road, 617 miles; trail, 2,167 miles.

Railroads (*Page* 31)

Only two railroads have extended their mileage since 1909. The Copper River and Northwestern Railroad (page 32) now extends from Cordova to Kennicott, Nizina Valley, 195 miles. The Alaska Northern, formerly Alaska Central (page 32), extends 71.6 miles from Seward, Resurrection Bay, to a point near the head of Turnagain Arm, Cook Inlet.

The conditions are so unfavorable that in the autumn of 1913 only 260 out of 466 miles of track were in use. The high cost of fuel and the federal tax of $100 a mile on all operating lines are the principal reasons assigned. The White Pass and Yukon, the Tanana Valley and the Copper River and Northwestern are the only lines that ran continuously during 1913.

Federal Aid to Railway Construction

The vital importance of railway transportation to the economic evolution of Alaska, and the impracticability of developing private systems—partly from financial reasons and partly from public policy—early at-

tracted the attention of Congress. An Act, section 18, approved August 24, 1912, authorizing an examination of the Alaskan transportation question and of the coal fields, to recommend "the best and most available routes for railroads in Alaska, which will develop the country and the resources thereof for the use of the people of the United States." The Commission appointed by the President consisted of Major J. J. Morrow, United States Army; Mr. A. H. Brooks, Geological Survey (an expert on Alaskan matters); Civil Engineer L. M. Cox, United States Navy; and Mr. C. M. Ingersoll, consulting railroad engineer.

The Commission acted with unusual vigor and promptness, so that its report was submitted to Congress by President Taft on February 6, 1913. The routes examined by the Commission are shown by Map No. 7, at the end of this volume.

The full report, H. R. Document 1346, 62d Congress, 3d Session, submits extensive data relative to the climate, resources, population, commerce, and present transportation routes. It then describes existing conditions, relative advantages of seven separate routes, and submits estimates of cost covering sixteen various routes, which include side lines to the coal fields. It also analyses the operating costs, and considers the markets for Alaska coal.

In its summary the Commission says: "The data presented shows that the United States possesses in Alaska frontier territory of great size and of wonderful industrial possibilities. The Commission believes that its climate is favorable to permanent settlement

and to agriculture; that its mineral resources are vast and as yet little exploited, but only by reason of its inadequate transportation facilities."

The Commission recommended the construction of railway lines as follows:

	Costing
1. Chitina to Fairbanks, 313 miles	$13,971,000
2. Bering River, coal branch, via Lake Charlotte, 38 miles	2,054,000
3. Kern Creek to Susitna Valley, 115 miles	5,209,500
4. Matanuska, coal branch, 38 miles	1,616,000
5. Susitna Valley to Kuskokwim, 229 miles	12,760,000

The recommendations covered two independent systems, involving an expenditure of $35,000,000 for 733 miles of new lines. One system would reach the coast over the Copper River and Northwestern Railroad, and the other over the Alaska Northern Railroad.

The report of the Alaska Railway Commission was received with favor, and bills providing for the construction of a system of railways at government expense were introduced in both the Senate and the House of Representatives. After a thorough discussion of the subject the Senate of the United States passed on January 24, 1914, a bill for this purpose. Although differences arose as to details, in no way affecting the general intent, the bill was passed with amendments by the House of Representatives on February 18, 1914. Both the Senate and the House were in accord as to the provisions which direct the President to purchase or construct 1,000 miles of railway in Alaska at an expense not exceeding $40,000,000. The President is authorized to select the route from tidewater to the inte-

rior, and to buy, or construct, and equip the same. Furthermore, he is given discretionary power either to operate the lines or to cause them to be leased. The Senate advocates a sinking fund to meet this outlay, to be formed from seventy-five per cent. of all moneys received through the sale of public lands in Alaska, and of coal or minerals therein. It is understood that the routes to be followed will be substantially those recommended by the Alaska Railway Commission, and shown on Map 7, at the end of this volume.

MINING IN GENERAL (*Page* 54)

The total values of the mineral products (Table 8, page 270) are as follows for recent years: 1909, $21,141,019; 1910, $16,887,244; 1911, $20,691,240; 1912, $22,537,821; 1913, estimated, $18,904,000. The five-year mean, as compared with that for 1904 to 1908, shows a small increase in gold and silver, and a very large increase in copper, nearly $1,750,000 annually. Coal is at a standstill. The marked decrease in 1913 is largely due to the unparalleled drought and local destruction of copper-plants, although the decreasing output of placers is a factor.

GOLD PRODUCTION

EXTENSION OF TABLE No. 3 (*Page* 263)

Year	Pacific Coast Belt	Copper River and Cook Inlet Regions	Yukon Basin	Seward Peninsula	Totals
1909.....	$4,264,716	$265,000	$11,580,000	$4,302,000	$20,411,716
1910.....	4,182,730	351,630	8,062,389	3,530,000	16,126,749
1911.....	4,265,573	313,538	9,139,145	3,135,000	16,853,256
1912.....	4,904,753	358,401	8,857,787	3,025,000	17,145,941
1913.....	*4,600,000	*360,000	*7,900,000	*2,590,000	*15,450,000

* Estimated.

Gold Mining (*Page* 55)

In general it may be said that placer mining is steadily decreasing, while lode mining is producing from year to year larger percentages of the entire output. An examination of the additions to Table 8, as above given, will show the variations for the principal districts.

Brooks, the mineral expert, tersely indicates the changes now progressing, and also points out the promise of stability and improvement. He shows that the contents of gold per cubic yard of sluiced gravel has steadily dropped in Alaska as follows: 1908, value $3.74; 1909, $3.66; 1910, $3.20; 1911, $2.17. Yet the perfection of mining methods permit successful exploitation, and indicate permanency of placer mining. In comparison he points out that the average gold recovery in the States is less than thirteen cents per cubic yard. This is encouraging, as placer mining still produces nearly three-fourths of Alaska's gold.

Juneau District (*Page* 66)

Mr. A. H. Brooks considers that the extensive preliminary work of development in the quartz regions of the Juneau district promises to make it the centre of one of the largest gold-producing areas of the continent. While the four mines of the Treadwell group are the only ones at present operating on a paying basis, it is expected that the properties of the Alaska Juneau and of the Alaska Gastineau Company will soon produce results of importance. Other near-by mines are also

in promising condition. The extensions of Table 8 show that the Pacific Coast belt is augmenting its output in late years. In this region, in 1913, there were twenty-seven gold lodes producing annually ore to the value of $5,000 or more.

Nome and Seward Peninsula (*Page* 79)

While the decrease in the output of this region is obvious, dropping from $4,302,000 in 1909 to about $2,600,000 in 1913, yet placer mining is on a firm and profitable basis. Dredge and hydraulic methods are now the general rule. The unparalleled drought of 1913 seriously affected conditions, and six of the thirty-seven dredges were idle.

The Yukon Basin (*Pages* 96 *and* 99)

The Fairbanks district, though showing gradually decreasing products, is in prosperous condition, the values of 1913 approximating $3,900,000. About 150 placer mines gave winter work to 1,000 and summer work to 3,000 men. Quartz mining, despite costly fuel and labor, progresses steadily. The thirteen lode properties produced gold to the value of $400,000 or more during 1913.

Bonanza placers have lately been discovered in the watershed of the upper Tanana, on an easterly fork of the Chitana River. Their extent and degree of permanency have not yet been determined.

Far the most important placer discoveries of recent years are the Innoko-Iditarod deposits (page 96).

The placers of the upper Innoko were the initial points of the rich Iditarod region. This district now includes the placers of the Iditarod, of the upper Innoko, and of the adjacent transdivide basins of the Takotna and other tributaries of the upper Kuskokwim. While the richest bonanzas have probably been exhausted, yet the production of 1913 is estimated at $2,000,000—this despite the drought. The original roundabout route in this district, via the Yukon and Innoko Rivers, has given way to a good winter trail, lined with roadhouses, from Seward. The wireless station at Iditarod keeps the community in touch with the *outside.*

Coal Mining (*Pages* 56 *and* 113)

The coal situation remains unchanged. One mine produced about 600 tons annually for local use. The Territory still depends for its fuel on high-priced coal from British Columbia and crude oil from California. A most illuminating and valuable contribution to this subject has been written by Mr. A. H. Brooks. It appeared as Bulletin 442 J, United States Geological Survey, under the title of "Alaska Coal and Its Utilization."

Secretary of the Interior, F. K. Lane, has taken up the important problem of restoring the coal fields of Alaska to public use, and it is probable that Congress will soon legislate along lines suggested by him. In his annual report of 1913 to the President, Secretary Lane says: "These coal fields (the well-known Bering and Matanuska veins of high-grade bituminous and

anthracite) . . . should be opened under a leasing and royalty system. The tracts opened should be disposed of to those who within a certain time would develop mines and make their product commercially available. . . . Sufficient land (2,600 acres might be taken as a maximum unit) should be leased as a body to justify long-continued and economical operation.

"The original lease should have a preferential right to a renewal until the mine is worked out. . . . A fixed minimum annual royalty would conduce to operation and prevent the holding of lands out of use. I would add one other precaution—that in each field a large body of coal land be reserved, so that the public and the navy might be rendered independent of private supplies, if that be necessary. . . . To stimulate the opening of mines, all royalty might well be waived for a brief period; later these royalties would be a not inconsiderable addition to the resources available for Alaskan development. . . . Small mines may be opened at isolated places, to supply a local and small need, under license to mine a small acreage without any charge whatever by the government."

Copper Mining (*Page* 56)

The very large increase in the production of copper, forecast in 1908, has materialized. The values for late years have been as follows: 1909, $536,211; 1910, $538,695; 1911, $3,408,484; 1912, $4,823,301; 1913, estimated, $3,014,000. The decrease in 1913 was due to the closing down for four months, owing to partial

destruction of plant, of the largest producer, the Kennicott Bonanza. There are now eight mines in the Copper River watershed and Prince William Sound region that are operating on a paying basis.

Petroleum (*Page* 115)

Though adverse conditions yet exist, the petroleum industry is slowly improving. A new well was drilled in 1913 in the Katalla oil field.

The Canadian Klondike (*Page* 237)

The mineral output of the Klondike region continues to increase as a result of the installation of the best modern machinery and the adoption of approved methods. The values of the production in late years are as follows: 1909, $3,960,000; 1910, $4,500,000; 1911, $4,634,574; 1912, $5,549,296; 1913, estimated, $5,600,000.

Mining Laws

An important matter has been a much needed modification of the mining laws. As amended, they restrict the association of placer claims to forty acres, with an annual obligation of labor or improvement to the value of $100 for each twenty acres until the patent issues. Power of attorney is limited to two for any one person in any one month.

SALMON FISHERIES (*Page* 127)

As will be seen from the following table, obtained from Dr. Hugh M. Smith, Commissioner of Fisheries,

the salmon industry has steadily increased in canneries, in output, and in value until 1913, when there was a very marked decrease—nearly one-tenth in quantity and one-sixth in value, indicating that the greatest care should be exercised to maintain the unimpaired efficiency of this most valuable industry.

Year	Salt Salmon	Canneries	Cases, 48 1-lb. cans	Value
1909.....	356,058	45	2,395,477	$ 9,847,885
1910.....	351,868	52	2,413,053	11,086,322
1911.....	404,079	64	2,822,817	15,127,377
1912.....	707,224	87	4,054,641	17,137,682
1913.....	823,846	79	3,739,185	13,531,604

COD FISHERIES (*Page* 135)

The bad condition of the cod fishery continued until 1910, when, with improved methods, the industry materially prospered, as appears from the following data furnished by the United States Commissioner of Fisheries: Value of Cod products, 1909, $118,821; 1910, $63,443; 1911, $108,790; 1912, $218,268; 1913, $357,-711. (Table 7, page 269.)

VOLCANOES (*Page* 166)

The moderately quiescent condition of the Alaskan volcanic belt was violently broken June 6, 1912, by the eruption of Mount Katmai, one of the least known for its activity. Investigations were immediately instituted by the National Geographic Society, through

Mr. George C. Martin, a well-known expert of the United States Geological Survey. Hitherto unknown as an active volcano, Katmai is a peak of 7,500 feet, situated near the coast of Alaska Peninsula, northwest of Kodiak Island. In the full and interesting account of the *National Geographic Magazine*, February, 1913, Mr. Martin says: "The eruption was undoubtedly one of the most violent of modern times. . . . Darkness lasted sixty hours at Kodiak (where the ash deposit was twelve inches deep), 100 miles from the volcano. Dust fell as far away as Ketchikan, distant 800 miles. The fumes were reported from points as remote as Puget Sound, 1,500 miles away. In the violence of explosion, in the quantity of material thrown out, and in the distance to which the ejected material and sound waves (the explosion was heard at Juneau, 750 miles), this was most certainly among the greatest eruptions witnessed by man. It differs from almost all other great eruptions in that the immediate danger to property was almost nothing, and that it was not the direct cause of the loss of a single life."

The last previous outburst on the mainland of Alaska was probably that of Pavlof (page 167) in 1903, though it was very much less violent.

GLACIERS (*Page* 252)

The National Geographic Society has prosecuted for several years an investigation of the glaciers of Alaska, the work being carried on by Professors R. S. Tarr (now dead) and L. F. Martin. The results of these

researches are now in press by the Society, under the title of "The Glaciers of Alaska."

TRADE (*Page* 246)

Within the past ten years the trade of Alaska has more than doubled, the total volume rising from $21,827,861 in 1903 to $47,922,511 in 1913. The data for recent years follow: 1909, $18,409,931 imports into Alaska, $14,072,011 exports from Alaska; 1910, $19,289,687 imports, $13,608,394 exports; 1911, $16,911,901 imports, $15,192,074 exports; 1912, $19,980,730 imports, $22,788,136 exports; 1913, $21,809,533 imports, $26,112,978 exports.

FUR-SEALS AND PELAGIC SEALING (*Pages* 120–124)

The unfortunate and disastrous results of pelagic sealing have given way to a more enlightened policy. Under a convention between Great Britain, Japan, Russia, and the United States, proclaimed December 14, 1911, pelagic sealing has been prohibited for a term of fifteen years in the waters of the North Pacific Ocean, north of the thirtieth parallel and including the seas of Bering, Kamchatka, Okhotsk, and Japan, there being excepted only sealing by aborigines dwelling on the coasts of the waters named, carried on for strictly local use in small canoes and without firearms, as hitherto practised. The results of sealing on various islands are to be equitably divided between the countries named, and when there are closed Alaskan seasons

a money indemnity must be paid by the United States to Great Britain and to Japan.

Under the Act of Congress, August 24, 1912, a close season of five years has been proclaimed for the Pribilof Islands, except that male seals may be killed by resident natives in such numbers as are necessary for their food, clothing, and for their skin-boats.

RESOURCES EXCEEDING FIVE HUNDRED MILLIONS OF DOLLARS

As deduced from the table of products for the past five years, the average value of materials (excluding such as are locally used in the Territory) shipped to the United States amounts to $35,441,110 annually. It thus appears that the $40,000,000 to be appropriated for the Alaskan railway systems is less than the products of the Territory for fourteen months—a most striking evidence of the recent development of Alaska's resources.

The grand aggregate of Alaskan products to January 1, 1914, reaches $505,987,429, derived as follows: Land furs, $10,242,293; aquatic furs, including the fur-seal, $64,381,369; salmon, $164,775,911; other fish products, $18,458,371; minerals, $248,130,025.

It should also be recalled that Alaska has meantime borne her proportionate share of fiscal burdens on the national account. To include the year 1913 the Territory of Alaska has paid into the Treasury of the United States, in the way of customs, internal revenue and other cash items, more than seventeen millions of

dollars. It thus appears that her aggregate contributions to the nation amount to the astounding sum of five hundred and twenty-three millions of dollars—a record possibly unsurpassed in the history of any other Territory of the United States.

PRODUCTS OF ALASKA

EXTENSION OF TABLE No. 8 (*Page* 270)

Year	Land Furs	Aquatic Furs, including fur-seal	Fishery Products		Minerals
			Salmon	All others	
1909.....	$318,605	$671,264	$ 9,847,885	$ 662,289	$21,141,019
1910.....	318,605	693,586	11,441,352	1,124,919	16,887,244
1911.....	313,730	472,646	15,127,377	1,263,705	20,691,240
1912.....	652,167	141,790	17,137,682	1,739,798	22,537,821
1913.....	*600,000	*10,000	14,449,234	1,289,834	*18,900,000
Total 1868 to 1913.	$10,242,293	$64,381,369	$164,775,911	$18,457,831	$248,130,025
Grand Aggregate.....					$505,987,429

*Estimated.

HANDBOOK OF ALASKA

CHAPTER I

GENERAL DESCRIPTION

It is unnecessary to narrate here the history of Alaska, especially as existent conditions in the Territory are entirely disassociated with the past as to material interests, and as to its administrative, judicial, or religious methods. However, Table No. 1[1] gives such matters of historical interest, and dates of occurrence, as are of special importance.

It is difficult to give an idea of the geography of Alaska that shall be brief and adequate, or satisfactory, owing to its vast area and its divergent conditions.

All are familiar with the accurate but misleading statement that Attu Island, Alaska, is farther west of San Francisco than that city is west of Eastport, Maine. The Alaska known to the tourist is a strip of coast and fringe of islands of about 425 miles by 100 miles, extending from Ketchikan north to Mount St. Elias,—in fact, about one-twelfth of Alaska. The main Territory just begins at St. Elias, stretching northward about 700 miles to the Arctic Ocean and the same distance to the westward to Bering Sea, its

[1] See end of volume.

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total area being given by Gannett as 590,884 square miles. Perhaps some idea of its great extent may be had from the statement that its area is one-third greater than that of the Atlantic States from Maine to Florida. While the northernmost land, Point Barrow, is more than 300 miles within the Arctic Circle with the sun absent forty days, its extreme southern point, at the entrance to Portland Canal, is in practically the same latitude as Hamburg, Germany.

Generally speaking, the southern two-fifths of Alaska consist of rugged, precipitous mountains, sometimes glacier-covered but more often densely wooded. The northern fifth is the largely treeless and barren shores of the Arctic coast. Intervening between these regions the remaining two-fifths are the watersheds of the great Yukon and the lesser Kuskokwim rivers. Other distinctively separate areas are the Seward (Nome) peninsula and the chain of Aleutian Islands. The general features of Alaska appear in the relief map between pages 42 and 43.

For the purpose of description the following are adopted as districts, in view of their distinct and separate entity from the standpoints of resources, business, and transportation:

1. Sitkan Alaska, covering the mainland and outlying islands from Ketchikan northward to Skagway. This is Alaska as known to the tourists, though only about one-twelfth of the Territory.

2. Southwestern Alaska—the watersheds draining into the Pacific, from St. Elias westward to the Alaskan peninsula and the outlying islands.

3. The Aleutian and Pribilof islands.
4. The Yukon and Kuskokwim watersheds.
5. The Seward Peninsula (Nome region).
6. The Arctic watersheds.

Sitkan Alaska includes the mainland and outlying islands from Ketchikan northward to Skagway. The mainland is a narrow strip, scarcely averaging twenty miles in width of available ground, overshadowed by the high, snow-capped mountains that separate Alaska from British Columbia. The whole of the Sitkan region is of the fiord type, the shores rising abruptly hundreds, often thousands of feet above the sea or straits, with bordering or entering fiords of such great and sudden depths as permit large-draft ships to safely skirt the very shore. The land surfaces are most irregular, and it is with difficulty that a square mile of fairly level land can be found. The whole country is more or less densely wooded to the height of several hundred feet above the sea.

Southwestern Alaska is also a fiord region, marked by three great inlets, Yakutat Bay, Prince William Sound, and Cook Inlet. While Yakutat Bay lies under the very shadow of the St. Elias Alps and its enormously debouching glaciers, it is favored with heavy forest growth wherever there is ice-free land. The continuity of the fiord coast is broken at the Copper River delta, where there is a great projecting shelf, with moderate depth seaward and shallows at the river mouth. To the west Prince William Sound and Cook Inlet, with the Kenai Peninsula between the two sounds, are magnificent in their fiord aspects and

glacier formations, which excel in beauty the more extensive glacial fields of St. Elias. In the inlet country, along and adjoining the glaciers, woodland regions are also extensive. The extreme west of the mainland, Alaska Peninsula, between Cook Inlet to the east and Bristol Bay, Bering Sea, to the north, is a mountain ridge of several hundred miles with sharply descending spurs and sides to the very sea. Its northeastern borders are divided between coast forests and lake districts, but seven-eighths are upturned stratified beds, with many volcanic peaks whose destructive activities are not wholly of the past, as instanced by Illiamna and Redoubt, by adjacent Bogoslof and Grewingk. To the south of the peninsula is the forest-covered isle of Afognak, and beautiful Kodiak, 3,642 square miles—largest of Alaskan islands, though some claim that it is second in size to Prince of Wales Island—where the forests of its northern coast thin rapidly to the southward.

The Aleutians stretch as a long bow-shaped chain of seventy treeless islands, excluding islets, for a thousand miles from Alaska Peninsula to the coast of Kamchatka; they extend so far that two groups—Nearer and Rat—are in the Eastern Hemisphere. From west to east the groups are Nearer Islands, W. of 175° E., of which probably Attu is best known owing to its basketry, and from its extreme western position, which in June holds the setting sun until it rises in Maine. Between 175° E. and 180° E. are Rat Islands, of which Semisopochnoi or Seven Peaks is one. The Andreanofski, of which Atka is well known, with its beautifully

woven baskets and mats, lies between 180° W. and 172° W. The most important and best known, however, are the Fox Islands, which lie to the westward of Alaska Peninsula. Of these is Unimak, washed by the pass of that name, which is the route to and from Nome; and Unalaska, on which the Dutch harbor is located, formerly the base of operations for trade and travel in the Bering Sea region. Scarcely more than a score of the Aleutian Islands are inhabited. In general the islands are desolate and scraggy, with many hot springs and other evidences of their volcanic origin, while several craters show minor activity.

While the Pribilof group, better known as the Seal Islands, are some 200 miles north of Unalaska, they appear to pertain rather to the Aleutian than to any other system; they are considered elsewhere (Chapter XIV).

Seward Peninsula. As one proceeds northward into Bering Sea the shore conditions materially change beyond Bristol Bay. The coast forests disappear and the low shores continue treeless to the Arctic Ocean, excepting a woodland fringe on the east shore of Norton Sound and in the eastern portions of Seward Peninsula.

The great sounds of Norton to the south and Kotzebue to the north, form Seward Peninsula, a region of about 20,000 square miles. Its flat-topped uplands, from 800 to 2,500 feet elevation, drain most largely to the south through broad valleys of the tundra type. The coasts are low and sandy, unsuited even in the few bays for shipping except very light draft boats.

Kotzebue Sound receives two quite large streams, the Noatak to the north with scant timber, and the more important Kobuk (Kowak) to the south, where considerable bits of forest and abundant game are found. For further references see Chapter X.

The most northerly and important cape of the Arctic coast is Point Barrow, 71° 25′ N. From Kotzebue Sound to Barrow the shore is low and sandy; thence eastward along the Arctic Ocean to the Canadian boundary the coast is low, without harbors, and fringed with outlying shoals. To the east of Barrow the country is practically uninhabited, although the interior forests, which begin about one hundred miles inward, and the watercourses are visited by Esquimaux hunters. As is elsewhere shown (Chapter XX), Point Barrow obtains its importance as a base of operations for the whaling industry.

The Yukon watershed comprises nearly one-half of Alaska, the river running in a bow-shaped, generally western course for 1,500 miles from the Canadian boundary to Norton Sound. It is separated from the Arctic coast by low ranges of mountains, in which find their sources far to the northeast in Canada the Porcupine, and in the north the Koyukuk, a parallel stream to the Yukon for several hundred miles. To the southeastward the watershed is limited by the lofty Alaska range, from whose glacial coverings flows the Tanana northward, joining the Yukon at Fort Gibbon. The Yukon watershed is practically covered with small timber, except in the lower reaches of a hundred miles or so in the delta country. In general the country

is rough, and apart from the mountain masses consists largely of low hills. Where it is not mountainous, as in the extensive flats near Fort Yukon, the plateaus are almost wholly tundra. The Kuskokwim watershed, while much smaller than the Yukon, is of the same general character; in its more elevated parts near the McKinley range forest covered and rough; but in the coastal region a tundra country interspersed with lakes, with many belts of timber, although its immediate delta is treeless.

Among the many interesting features of Alaskan geography there are four which are notable owing to their practical absence from the physical features of the United States. These unique characteristics are the fiords, the glacial fields, the volcanic ranges, and the tundra regions.

The sharply indented fiords have great depth of water, are confined by lofty precipitous cliffs, and many are from 20 to 100 miles in length. With many ramifications they intersect the mountainous coasts of the Alaskan mainland from Portland Canal northward to Prince William Sound. Their beauty and picturesqueness are set forth elsewhere (Chapter XVII).

The Alaskan mainland as far north as the Alaska Peninsula presents ideal conditions for extensive glaciation. The shores rise precipitously from the open sea, while the atmospheric pressures are so distributed that the vapor-laden winds are normally drawn upward over the mountain ranges. Largely through the cold of elevation, the prevailing fogs and clouds in their passage deposit their moisture as snow. So

frequent are such cloud-bearing currents that enormous snowfalls occur, exceeding in many places a hundred feet or more annually (see Chapter II); hence the great glacial fields or névés of Alaska, which are nowhere else equalled on the North American continent. While such conditions obtain to a greater or less extent over an area of more than 40,000 square miles—of which one-fourth is ice-clad—the deepest snowfalls and the maximum resulting névés are between Icy Strait, south of the Fairweather range, and the Kenai Peninsula to the west of Prince William Sound.

Apart from the larger glaciers, numbering two hundred and more (see Table 5), Muir writes:

> In the iciest region the smaller glaciers, a mile or two to ten or fifteen miles in length, once tributary to large ones, now fill in countless thousands all the subordinate cañons and upper hollows of the mountains.

The grandeur and splendor of these wonderful remnants of the great ice age are set forth in Chapter XVIII.

In striking contrast to the great glaciers of the central névé region, are the adjacent peaks of fire and lava. From smoking Wrangell of to-day there stretch westward for a thousand miles a series of volcanic-formed peaks, mute witnesses of the terrific internal forces which rent the earth, displaced the sea, and re-formed lands of considerable extent. Dead craters they are mostly termed, but ever-changing Grewingk (New Bogoslof) Island affords living evidence that the

days of lava torrents, flame columns, uprising ridges, and tidal waves have not passed for aye. The awe-inspiring exhibitions of volcanic forces are considered in Chapter XIX, in connection with the subject of Alaskan mountain masses.

Wonderfully dissimilar to peaks of fire and rivers of ice, as well as to striking conformations of cañon and fiord, are the immense coastal plains scarcely rising above the level of Bering Sea, and the gently undulating plateaus bordering many reaches of the Yukon and Kuskokwim. As English speech found no name for our Western prairies, so Americans have adopted the Siberian tundra to describe the Alaskan lowland. The tundra is a marshy, practically unbroken plain, overgrown with vegetation, which, though level to the eye, presents surfaces most irregular in form and hence most difficult to traverse. Collier thus describes it:

> On the lowland plains and portions of the upland where drainage is imperfect a thick mat of vegetation, composed of mosses, lichens, sedges, dwarf shrubs, and some grass, overlying peat beds, covers the surface and forms the tundra. The underlying soil is perpetually frozen, as the mat of vegetation and peat protects it from changes of temperature, but during the open season the tundra is difficult to traverse on account of its soft, swampy surface.
>
> In many places the tundra is covered with great, detached bunches of rough grass, known as nigger-heads, and travel is possible only by stepping from one bunch to another—a most exhausting method owing

to irregular distances between the niggerheads and the uncertain footing afforded by them.

Bibliography.—Baker: Geographic Dictionary of Alaska; Bulletin No. 299, United States Geological Survey, 1906. Brooks: Geography of Alaska; Professional Paper 45, United States Geological Survey, 1906. Gannett: Geography of Alaska; Harriman Alaska Expedition, 1901; Dall: Alaska and Its Resources; Elliott: Our Arctic Province; Alaska and the Seal Islands.

CHAPTER II

GOVERNMENT AND LAWS

In the early years of Alaska's history as a part of the United States, it suffered from the utter neglect of Congress as regards law and government, so that there were grounds for the application to the Territory of Kipling's aphorism that

Never a law of God or man
Runs north of Fifty-three.

Article III of the treaty of cession, ratified by the United States May 28, 1867, contains the provision that—

The inhabitants of the ceded territory . . . if they should prefer to remain in the ceded territory, they, with the exception of the uncivilized tribes, shall be admitted to the enjoyment of all the rights and immunities of citizens of the United States, and shall be maintained and protected in the free enjoyment of their liberty, property, and religion. The uncivilized tribes will be subject to such laws and regulations as the United States may from time to time adopt in regard to aboriginal tribes of that country.

For seventeen years Congress took no action regarding Alaska save to protect financial interests, which it did July 27, 1868, by extending to it laws relative to customs, revenue, and navigation, and their enforcement

by the courts of California, Oregon, and Washington. In 1869 it established the Seal Islands as a reservation and authorized their lease the year following. Then for fourteen consecutive years Alaskan legislation was totally neglected.

The President took action by sending the Army in 1867 to protect Alaska (see Chapter V), but after ten years of stormy experiences it was entirely withdrawn and Alaska was left to its fate.

Murder, rapine, and lawlessness followed, and the citizens of Sitka in one extremity appealed for aid to British Columbia and for a time were protected by the British Navy. Later the Revenue Marine Service and the United States Navy alternately assumed control of local affairs.

Of conditions in Alaska from 1867 to 1897 a most competent authority, W. H. Dall, writes:

> A country where no man could make a legal will, own a homestead or transfer it, or so much as cut wood for his fire without defying a Congressional prohibition; where polygamy and slavery and the lynching of witches prevailed, with no legal authority to stay or punish criminals; such in great part has Alaska been for thirty years.

He properly adds:

> It will be a perpetual testimony to the character of the early American settlers in Alaska, that under the circumstances they bore themselves so well.

This tribute to Alaskans confirms statements often made by the writer, based on his frequent visits to and long experiences with Alaska, that as a whole its in-

habitants are the most law-abiding body of men that he has ever known.

Seventeen years after the cession, the Act of May 17, 1884, extended the laws of Oregon to Alaska, authorized a governor, established district courts and commissioners, created a land district, prohibited importation of liquors, granted mining rights, looked to inquiries regarding the Indians, and provided for schools,—legislation that was at least a beginning, though most inadequate in means and extent.

Where moral obligations failed, material interests prevailed. The discovery of gold and the influx of miners impelled Congress to act, and on May 14, 1898, railway rights were granted. On March 5, 1899, thirty-two years after the cession, Congress gave Alaska its first penal code and also a code of criminal procedure, both drawn from the statutes of Oregon. The Act of June 6, 1900, providing for a civil government, made the Territory a civil and judicial district, and established the seat of government at Juneau. It enlarged the powers of the governor and other civil officials, provided for the insane, established district courts for each of the three judicial divisions of Alaska, provided for public records, extended coal-land laws, confirmed the rights to lands actually used by Indians, schools, and missions, provided for secondary education, and established a system of licenses on all classes of business.

The law of May 14, 1898, being inoperative as to homesteads—as there are no surveyed lands in Alaska —it was amended March 3, 1903, so that a homestead can now be entered on unsurveyed lands.

Since May 7, 1906, when Alaska was recognized as a "Territory," it has representation through a delegate in Congress.

While the Territory now has executive and judicial officers, it is without any legislative body, and so depends on Congress for all laws and legislation.

Judicial provisions are still inadequate to the needs of the country. In default of a supreme territorial court, appeals necessarily go to the Ninth Circuit of the United States Court of Appeals, causing serious delays and enhanced expenses. The Aleutian Islands are practically without courts, and the enormous area of the third judicial district, the Tanana and Yukon valleys, overtaxes the judge, delays trials, and enormously increases costs. Minor causes are tried before United States commissioners—stationed at about forty points—who are appointed, and are removable by the district judges. The power of the commissioners is great, as they are committing magistrates, can try civil cases involving values to one thousand dollars, and criminal cases of certain classes where not exceeding a year's imprisonment may be imposed. They are also empowered to perform almost every kind of judicial acts pertaining to their own localities.

All things considered, governmental provisions for Alaska have been wonderfully improved within the past decade, and future advances will be made whenever there is practical unanimity of recommendation on the part of Alaska's leading citizens.

Bibliography.—Reports of the Governor of Alaska to the Secretary of the Interior, 1901 to 1908; Harrison's Alaska Almanac, 1908.

CHAPTER III

CLIMATE

THE impression is general that the climate of Alaska is arctic in its character and its severity. Several years since life insurance was refused a resident of Ketchikan on the ground that undue risks were entailed by his harsh surroundings and especially severe climate. It is difficult to convince people that there is no typical Alaskan climate, any more than there is an European or American climate. The extremes of latitude and longitude in Alaska find their parallel in Europe between Norway and Sicily—equal to the difference between Point Barrow and Ketchikan—and from western France to central Russia, about the distance from the Alaskan Peninsula to Skagway.

Attempts to convey an idea of climate by the annual means of temperature, rainfall, etc., are fallacious and unsatisfactory. The temperature equability is best shown by the mean temperatures of the warmest and of the coldest month. As an illustration it is known that San Francisco and St. Louis, which are in substantially the same latitude, have the same mean annual temperature, about 55:7°. The variations of the former place are small and inconsiderable, from 50.2° in January, the coldest month, to 59.7° in September, the warmest month—a range of less than 10°

in the monthly means. In St. Louis, however, the range is from 31.6° in January to 78.4° in July—a range of 46.8°, or nearly five times as great as at San Francisco. It is pertinent to note that the coldest month of Sitka, 33°, closely agrees with the coldest month of St. Louis.

As a matter of fact the mean monthly temperatures of Alaskan stations are very high, when one takes into consideration the northern latitudes of the territory. Naturally the Aleutian Isles are favored by most equable temperatures through the influences of the Pacific Ocean. This is shown by the mean temperatures of Unalaska of 51° for August and 30° for February. Unalaska, it may be noted, is in 54° N., the latitude of southern Labrador.

While the modifying oceanic influences affect the southern Alaskan coast to the very peninsula, it is most noticeable in Sitkan Alaska, which presents a northerly extension of the temperature conditions of the California and Washington coast region, especially during the summer. The mean temperature of San Francisco, Cal., and Port Angeles, Wash., for August is 58°, while that of Sitka is 57°, and of Juneau for July 57°.

In general the Sitkan archipelago presents a humid, equable climate, with cool summers, warm winters, and very frequent rain or snow. Of the coast stations Sitka is typical, with its annual rainfall of 111 inches, its mean of 33° for the coldest month, February (practically identical with the January mean of St. Louis), and of 57.2° for the warmest month, August.

Along the coast extremes are rarely known, the highest in 45 years at Sitka being 87° in August, while the lowest ever recorded is —3° in February. Compare these figures with St. Louis, 106° in August and —21.5° in January, and the equability of temperature in southeastern Alaska is obvious. Similar temperature conditions obtain in summer from the St. Elias region westward to the Alaskan Peninsula, though the winters are considerably colder. Along this coast the precipitation—rain in the south and snow in the north —is frequent and heavy, being sometimes excessive. For instance, at Valdez the snowfall in the winter of 1902–1903 was 60 feet 11 inches, the maximum snowfall here observed; the average annual precipitation is 72.8 inches of rain and melted snow. At Nuchek Harbor, near by, there was a rainfall in one year of 190 inches. These large amounts of rain and melted snow indicate that over the adjacent regions there fall in some years from 60 to 150 feet of snow, which explains clearly the presence of the proportionately large number of living glaciers in Prince William Sound and Yakutat Bay.

In this connection Professor George Davidson points out the great desirability of regular climatological observations, especially with reference to sea-currents, winds, humidity, and rainfall.

Farther to the northward the coasts are washed by the Bering Sea, a cold body of water with an average temperature of about 39°. In consequence of the cold sea, its adverse winds, and the increasing northing it is natural to find a harsher climate from Bristol Bay

northward. The conditions of the southern half of Seward Peninsula, of which Nome is the business centre, are best indicated by the records of St. Michael, 100 miles south of Nome, where the equable and high summer temperatures (53.6° in July) are offset by low winter means reaching —2.3° in February. Its rain and melted snow during the year averages 14.6 inches.

The Arctic coasts from their high latitude, and consequent loss of the midwinter sun, forty days at Point Barrow, experience prolonged winter cold and brief summers. The scanty precipitation is almost entirely in the form of light, winter snowfalls. Point Barrow is a typical winter station, with a yearly rainfall of 6.62 inches and average temperatures of 39° in July, the warmest month, and of —21° in January, the coldest month. The severity and length of the winter are shown by the fact that the average temperature is below zero from November to April, the mean for the six months being thirteen degrees below zero.

As one enters the interior of Alaska, whether by the Copper River, the Kuskokwim, or the Yukon, the climate becomes continental, with great ranges of temperature between the short, comparatively hot summers and long, cold winters. Within a hundred miles of the coast the oceanic influence largely disappears, its gloomy humid aspects giving way to brighter skies and decreasing rain or snow. The culmination of the summer heat and of the winter cold is found at almost the greatest distance from the surrounding seas —in the valley of the upper Yukon. The typical station for this region is Fort Yukon with its July

mean of 64° and a January mean of —31°, which, compared with Point Barrow, 300 miles to the north, shows a lower temperature of ten degrees in winter and a higher temperature of twenty-five degrees in summer.

The rigors of the past climate are strikingly illustrated by the great depths to which the ground is frozen. In the Nome region a shaft has been sunk 120 feet without reaching ground free from frost, and near Dawson the earth was found frozen to the depth of 200 feet.

Table No. 2 gives the mean temperatures and rainfall for ten typical and well-distributed stations.

Bibliography.—Dall and Baker: Pacific Coasts Pilot; Appendix 1. Meteorology, 1879, Abbe: Climate, in Brooks's Geography of Alaska, Professional Paper 45, United States Geological Survey, 1904; Annual Reports of Chief Signal Officer of the Army, 1878 to 1885.

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CHAPTER IV

WATERWAYS, ROADS, AND RAILROADS

The entire absence of roads in Alaska, until the past three years, has made river transportation practically the only method of extended travel in the Territory. Fortunately the river systems of Alaska are such as to facilitate very greatly personal travel and the movement of freight during the four or five months of open season. Waterways in Alaska navigable by steamers approximate 4,000 miles, of which nearly 2,700 are in the Yukon watershed.

WATERWAYS

The great artery of summer travel and freight is through that magnificent stream, the Yukon, which divides Alaska into two nearly equal parts in its course of about 1,500 miles, flowing in a bow-shaped course, in its general direction of east to west. Formed by the junction of the Pelley and Lewes, its length from the source of the Lewes to the Yukon delta, Norton Sound, is 1,865 miles, its length in Alaska being about 1,200 miles. Flowing in its upper reaches through cañon-like valleys, it debouches shortly after entering Alaska into a plateau tundra region, where its wide

and winding channels divide and flow sluggishly—especially in the great flats near Fort Yukon; there the islands and cut-offs make the river from ten to thirty miles wide—again to find precipitous confining mountains in the so-called rampart region, near Fort Hamlin. From Fort Gibbon to Norton Sound the river valley grows steadily wider, until the vast, treeless delta region is reached, about 100 miles inward from Norton Sound. The delta has an area of about 9,000 square miles, greater in extent than any one of the States of New Jersey, Massachusetts, Maryland, Vermont, or New Hampshire.

Although one of the largest rivers of North America, exceeded in length or volume by only the Mississippi, Mackenzie, St. Lawrence, and Winnipeg, yet the usefulness of the Yukon, though navigable throughout its entire extent, is largely restricted by its very shallow mouths, which admit boats drawing not over three or four feet of water. In consequence all freight shipments for the Yukon watershed are transferred from the ocean steamships to river steamboats which run to St. Michael, ninety miles seaward from the Apoon mouth of the delta.

The Yukon navigation is divided into two sharply separated systems—the Canadian and the American—with Dawson, Yukon territory, as the line of demarcation. This is caused by the customs and navigation laws, which practically necessitate the transshipment of everything in and out of Alaska via the upper Yukon, at Dawson; and again every boat coming into the Alaskan Yukon is obliged to stop and submit to cus-

toms' examination at Eagle, about 100 miles below Dawson.

The Canadian system is also affected by the spring and summer conditions of the chain of lakes, which forms the extreme upper Yukon (or Lewes), through early autumn freezing and late break-ups in the spring. The more rapid, as well as the more northerly, river keeping open longer than the lake section, part of the steamers are wintered north of Lake Lebarge, near the mouth of the Hootalinqua, ninety miles north of White Horse—which is the terminus of the White Pass and Yukon Railway. In six years' consecutive record, the average period between the dates of the first boat and last boat from White Horse to Dawson was four months and nineteen days—from June 4 to October 23. The average date of the first boat from Hootalinqua to Dawson was May 13,—thus lengthening the navigation period by twenty days. The earliest date that the first boat has reached Dawson was May 16 from Hootalinqua, but in two years it was delayed until May 26. The average date of the last boat arriving at White Horse from Dawson is October 28, although in 1902 a boat arrived as late as November 4.

At Fort Gibbon (Tanana P. O.), junction of the Yukon and Tanana, the two rivers are open on the average by May 13 and closed by November 1, an interval of five months and nineteen days. In eight years the opening of navigation ranged from May 7 to 24, and its closing from October 21 to November 9.

The period of navigation from Fort Gibbon up the Yukon River, to Dawson, is materially longer than it

Steamer *Sarah*, of the Northern Commercial Company.

(At Eagle, Upper Yukon: Eagle Mountain in the background.)

is down river toward Norton Sound; its mean duration in three consecutive years being four months and fourteen days to Dawson, from May 21 to October 5. Toward St. Michael the time of navigation averages three months and fifteen days, from June 15 to September 30. The arrival of the first boat from Dawson has ranged from May 19 to 23, and from St. Michael from June 2 to 24.

Between Fort Gibbon and Fort Egbert (Eagle City), 575 miles up the Yukon, the boats usually run up river from June 1 to October 6, and down from May 16 to September 17. In general it takes twice as long to go up the Yukon by steamboat as it does to come down the same distance.

The most northerly important affluent of the Yukon, within Alaska, is the Porcupine, which joins it at Fort Yukon, just north of the Arctic Circle; it is navigable for light-draft steamboats for about 100 miles. On this, as on other rivers, small poling boats are available for navigation to much greater distances, dependent largely on freshet-water conditions.

From its volume of water, length of course, and its commercial relations, the Tanana is far the most important tributary of the Yukon. First navigated in its lower reaches in 1893, it was opened to Chena in 1898, and regular summer navigation has been had since 1901 with Fairbanks, about 300 miles up the river. Occasional steamboats have carried supplies up the Tanana to Delta River, and one reached the junction of the Nabesna, about 700 miles from the mouth of the Tanana. If mineral developments should

ever justify, the Tanana and its main upper fork, the Chisana, could be navigated by very light-draft boats for a distance of about 750 miles. Among the Tanana's affluents, the Kantishna has been navigated about 200 miles, while the Chena, Tolovana, and lower Volkmar are likewise practicable for light steamers, and most other tributaries for small boats.

The period of navigation on the Yukon is exceeded in duration by that on the Tanana. For three years between Fort Gibbon (Tanana post-office) and Chena or Fairbanks, its usual duration was five months. The average date of opening was May 14 and of closing October 14. A boat has reached Fort Gibbon from Chena as early as May 8, and as late as October 17.

In Cook Inlet region the Susitna, with a basin of 8,000 square miles, has been navigated by steamers to the mouth of the Chulitna, and its main tributary the Yentna to the mouth of the Kichatna. In Lynn Canal the Chilkat is practicable for very small steamers to Klutwan, 25 miles from the mouth.

The Copper River is now navigated during the months of July and August, in conjunction with the Copper River Railway, from the head of Abercrombie Rapids to Copper Centre, while the mouth of the Gulkana can be reached. It is thought that the upper Copper, now practicable for poling boats, can be utilized for very light-draft steamers. The Chitina, a tributary of the Copper, is navigable to the Nizina, and possibly the mouth of the Tana may be reached.

The Alsek, Kvichak, Unalaklik, and many other small rivers are practicable for poling boats.

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Portages

In no country are portages of greater importance to the traveller than in Alaska. The following are the most important:

Chipp-Colville.

Cook Inlet with Illiamna Lake, via Illiamna Bay.

Copper with Tanana.

Koyukuk with Kobuk, via Alatna, and via Hogatza.

Koyukuk with Yukon, via Chandlar, via Dall, via Tozi, via Hosiana and Melozi.

Kuskokwim with Nushagak and thence to Chulitna.

Kuskokwim, see Tanana and Yukon.

Kuskokwim with Togiak Lake.

Nushagak with Chulitna.

Tanana with Kuskokwim, via Cosna and via Kantishna.

Tanana with Copper.

Tanana with Yukon, via Fortymile and Volkmar.

Yukon with Lynn Canal, via Chilkat or Chilkoot Pass.

Yukon with Mackenzie, via Porcupine and Bell (or Peel).

Yukon with Kuskokwim, probably via Innoko and also Nowi, and via series of lakes opposite Ikogmut.

Yukon with Koyukuk, via Chandlar, via Dall, via Hosiana, via Melozi, via Tozi and Kanuti.

Yukon with Tanana, via Fortymile and Volkmar.

Yukon with Norton Sound, via Kaltag and Unalaklik.

ROADS

The advisability of supplementing summer means of water travel by a suitable system of roads was obvious early in the development of the resources of Alaska. It was not, however, until the Act of January 27, 1905, that means and methods were provided. Through a board of road commissioners, and by liberal appropriations by Congress, in addition to the allotments from the Alaskan license fund, an economic revolution has been wrought in land transportation. Fortunately the road commissioners, composed of three officers of the Army, has had as its president Major W. P. Richardson, whose executive ability and activity, supplemented by experience gained during twelve years of service in various parts of Alaska, have accomplished great results since 1905. Congress appropriated $150,000 in 1906; $250,000 in 1907; $250,000 in 1908; and $350,000 in 1909. In addition it gave $35,000 to survey a road between Fairbanks and Nome, and had previously appropriated $1,500 for the survey of a road from near Dall River to Coldfoot, and about $6,000 for a road survey between Valdez and Coldfoot.

Naturally each mining district considered its claims and local needs of the greatest importance, but the commissioners first applied themselves to roads of the greatest importance to the Territory as a whole, and recognized local needs only when urgently and obviously important. First in order were roads to insure regular and speedy mail service during the entire year,

and to provide facilities for its transportation over American territory, and independently of Canadian assistance as far as possible. Prior to the establishment of this road system almost the entire interior of Alaska was without mail for weeks at a time during the periods elapsing between the close of navigation, the freezing of streams, and the forming of winter trails; similar delays obtained after the break-up each spring.

The most important line of overland travel in Alaska is unquestionably that located and built northward from Valdez by the road commissioners for Alaska. Following the United States Signal Corps telegraph line, it connects Valdez, the most northerly open port in North America, with Fairbanks, which is the practical head of navigation on the Tanana River. Winter mails for all Alaska north and west of Valdez pass over this system of roads. At Fairbanks begin various other roads and trails, over which Circle, Fort Gibbon (Tanana), Nome, and the rest of the Seward Peninsula are reached.

Between Valdez and Fairbanks the length of the road travelled in summer is 385 miles, reduced in winter by cut-offs to 354 miles. Although practicable for heavy freight in winter only, yet the road is passable in summer for buckboard or light-wheeled traffic for over three-quarters of the distance, and by horse trail the rest of the way. All river crossings are passable, except the Tanana, Gulkana, and Delta glacial stream, where ferries or bridges are now under process of construction.

From Valdez the road passes through Keystone

Cañon, Lowe River, and over Thompson Pass into Copper River Valley. Continuing through Teikhill Valley and crossing the Tonsina, Klutina, and Tazlina rivers it then follows the west bank of Copper River, which it leaves to ascend the Gulkana on its north bank, crossing the river by ferry. Reaching the Delta glacial stream through Isabelle Pass, summit of the Alaskan range, it keeps the east bank to the Tanana River, which is crossed by private ferry; thence to Fairbanks, some ninety miles, it closely follows the Tanana. In winter the route is shortened by divergence about thirty-five miles above the mouth of the Big Delta, where a marshy tundra, practicable only when frozen, is crossed to the confluence of the Little Delta and Tanana, at Washburn.

Practically the whole route is settled, though sparsely, and road-houses are situated at intervals of ten to twenty miles, where most comfortable accommodations are found. Many of these enterprising proprietors have made homestead entries, are keeping stock, growing grain fodder, and raising vegetables which are often abundant and excellent. Their presence and facilities tend to the thorough exploration of the adjacent mineral fields by the ever-present and persistent prospectors.

The main mail artery, passing through Hot Springs and Fort Gibbon, continues down the Yukon via Nulato, and over the Kaltag portage to Unalaklik, whence, St. Michael being reached by a side route, the shores of Norton Sound are practically followed to the settlements of Seward Peninsula and Nome.

Winter Travel on the Army Road, North of Valdez.

This system of roads has already accomplished the main end sought by the commissioners, the rapid and regular transmission of through mails in all Alaska. The average time for mails from Valdez to Fairbanks was reduced to 8 days, 16 hours, and 25 minutes during the winter of 1907–1908, and one mail was transported in 6 days and 8 hours. Winter mail from Seattle is now delivered in about 43 days at Nome, and has been transmitted in 38 days. A private dog team has travelled over this road to Nome in 30 days from Seattle and 23 days from Valdez. Winter express service was before impossible for interior Alaska, but now such matter is regularly delivered, and much winter freight is handled, to the great advantage of the Territory as a whole.

In the vicinity of Fairbanks there are eight local roads aggregating 64 miles in length. Longer separate routes are the sled roads from Cleary to Birch Creek, 54 miles; from the mouth of the Salcha to Caribou, 45 miles; and the road from Hot Springs to Gulch Creek region, 22 miles.

Fairbanks is really the centre of the road system of Alaska, as from that point roads and trails not only lead to the adjacent mining districts, but also eastward to the Salcha Valley; northeastward to Circle, Eagle, and Dawson; and northwestward to Hot Springs. This last road is the most important, the great winter mail route to Fort Gibbon (Tanana); to the entire Yukon Valley except Eagle and Fortymile, which are reached via Dawson; to the Koyukuk region; to Seward Peninsula and Arctic Alaska—Point Barrow, etc.

In addition to its connection with Fairbanks, before mentioned, Eagle can now reach Fortymile over an American road, though previously nearly all travel and all supplies passed through Canadian territory.

On Seward Peninsula Nome is connected with all important mining camps not reached by railway. There are on the peninsula sixteen roads aggregating 50 miles in length. Freighting is now practicable over the greater portion of the peninsula, where packing was the only method of transportation some time since.

The flagging of winter trails in this bleak and treeless tundra country has rendered travel in the winter darkness, during periods of storm, much less hazardous. The difficulties of safe travel on Seward Peninsula are very great during the period of winter and almost sunless days over a gently rolling unbroken tundra, where there is no tree, bush, or even stone to mark the trail or relieve the unvarying monotony. In earlier years scores of bewildered travellers have wandered from the dim, snow-covered trail and miserably perished in the winter blizzards. The extent of such travel and the length of routes are conveyed by the statement that nearly 500 miles of such trails are annually flagged,—slight sticks provided with red flannel flags being planted in the snow from 50 to 100 yards apart, according to the character of the country.

The road commission looked in its construction to doing standard work that would be of lasting and permanent benefit. They have built good country roads 16 feet wide, winter sled roads 12 feet wide, trails 8 feet, and bridges 14 feet wide. The immediate

result of road building was the reduction of freight rates about half along their routes, while travel increased enormously, to the general good.

RAILROADS

There can be no stronger evidence of the permanency of the population and industries of Alaska than the construction of railroads in this far-distant territory. The law of May 14, 1898, granted to duly incorporated railways, wagon roads, and tramways a right of way of 100 feet on each side of the road. Twenty-seven railways, four tramways, and several wagon roads have filed articles of incorporation. Ten corporations have built railways, aggregating 333.5 miles of completed road, which are distributed as follows:

Southeastern Alaska

White Pass and Yukon Railroad, from Skagway to international boundary, narrow gauge, 20.5 miles. Extends 90.5 miles into Canadian territory to White Horse, the head of navigation on the Yukon. Railway runs the entire year; connecting steamboats from White Horse run about five months each summer to Dawson, which in winter is reached by stage from White Horse.

Yakutat Bay Region

Yakutat Southern Railroad, standard gauge, 12 miles, from Minto Bay Cannery to Situk Bay for salmon during fishing season; also handles lumber.

Copper River Region

Copper River Railroad, standard gauge, 53.5 miles from Cordova to head of Abercrombie Rapids (1908). Graded or cleared many miles in advance of present terminus. Operates steamers on Copper and Chitina rivers in summer. Construction work is progressing steadily via the valleys of the Copper and Chitina to the confluence of the Nizina and Kennicott rivers, in the heart of the copper district.

The Copper River and Northwestern Railroad, standard gauge, 6.5 miles, from Katalla connects with Copper River Railroad.

Kenai Peninsula (Cook Inlet)

Alaska Central, standard gauge, 52 miles, from Resurrection Bay to vicinity of Lake Kenai, near head of Turnagain Arm. The road is graded more or less to the 93d mile, and the right of way cleared to the 110th mile, near Sunrise.

Cook Inlet and Coalfields Railroad, narrow gauge, 8.5 miles from Homer, Kachemack Bay to coal fields. (Suspended operations temporarily.)

Fairbanks District

Tanana Railroad, narrow gauge, 44.5 miles, from Chena to Gilmore and to Chatinika (near Cleary Creek) 40 miles, with branch of 4.5 miles to Fairbanks. Runs the whole year, connecting the most important placer mines.

Tanana Mines Railway, near Fairbanks.

(Connecting the principal placer mines.)

Seward Peninsula

Council City and Solomon River Railroad, standard gauge, 33 miles, from Solomon to Penelope Creek.

Golovin Bay Railroad (also called Wild Goose Railroad), narrow gauge, 6.5 miles, from Council City to Ophir Creek.

Seward Peninsula Railroad, narrow gauge, 96.5 miles, from Nome to Shelton 85 miles, with the Paystreak and Sunset branches of 6 miles each. This is the "Wild Goose" railway of 1900. An extension of twenty-two miles into the Kougarok district is arranged from Shelton, the present distributing centre.

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CHAPTER V

THE ARMY IN ALASKA

A BRIEF statement as to the work of the Army appears desirable, owing to its extended period of occupation, and the important part played by it in the government, exploration, and development of the Territory. The general character of its services is set forth by Mr. O. P. Austin in his valuable "Commercial Alaska," where he says:

Since the foundation of our government the lines of the Army have advanced simultaneously with the advance of the settler along our vast frontier. It has been the uniform policy of the government to foster the development of the country by exploring and opening up trails for emigrants and prospectors, convoying their supplies, aiding in the transmission of their mail—in all things extending a helping hand to them and in keeping step with the advance of American civilization. The Army of the United States has always been the advance guard of civilization. Wherever it has gone its protection has been freely given to every American citizen.

It was General L. H. Rousseau, United States Army, who formally accepted Alaska from Russia, and occupied Sitka with a military force on October 18, 1867. Military posts were established at Kenai, Kodiak, Sitka, Tongass, and Wrangell, with detachments on the islands of St. Paul and St. George; all except Sitka were withdrawn in 1870.

The duties of the Army were neither formulated in regulations nor authorized by law. Their scope as viewed by officers was to prevent difficulties between incoming Americans and the Indians, and properly to enforce the provisions of the Indian trade and intercourse laws regarding arms and liquor. General Howard stated that it would be easy for the Army, if duly authorized, to preserve peace and establish police regulations, but authority so to do was questioned by the United States District Court, while the repeated efforts of the commanding general to secure the establishment of a civil government were steadily ignored.

The activity of the Army in carrying out its orders elicited bitter criticism. Reporting on affairs at the Seal Islands, prior to the lease of the Alaska Commercial Company, it incurred enmity by officially stating that the Pribilof natives were suffering "enslavement and robbery by an unscrupulous ring of speculators." As Indian wars give local traders patronage and contracts, the tendencies to adjust troubles peacefully with the natives were viewed askant as unmilitary and unbusinesslike. To stimulate industry among the natives, it was recommended that Indians be hired to cut wood, which resulted in attacks from interested contractors. The Army's insistence that Alaska was an Indian country, where neither firearms nor liquor could be imported, was bitterly fought by traders and politicians before the department, and it was years before the Army's point of view was sustained by Congress and the courts.

Meantime civil regulations authorized the importa-

tion by officials of liquor in "limited quantities." Sales of "surplus" liquor, with smuggling of arms and spirits, steadily proceeded, with unfortunate results. Treasury officials sold in Sitka at public auction liquor seized by the Army, and then blandly complained that the military was not suppressing the liquor traffic. Repeated requests for a steam vessel to permit raids on smugglers and liquor dealers were without avail.

Disturbed conditions due to the Stikine gold discoveries led to the reoccupation of Fort Wrangell in 1875, the impossibility of otherwise maintaining order and peace being generally recognized. Finally—happy day for the service, though not for the Territory—the Army sailed away from Alaska, after, as we are told by a well-known writer, a service not highly creditable. This local judgment was natural, since the business methods of many of the early Alaskan captains of industry did not accord with Army ideals as to probity and propriety.

The Army's sins of omission and commission were not specified, but what it did may be stated. It had brought the Indians into a state of submission and peace—its military duty. Moreover it had fed the starving, cared for the suffering, and nursed the sick; it had largely suppressed smuggling and illegal trade in arms and liquor; it had discouraged corrupt business methods and protested against the enslavement and robbery of natives; it had vainly besought civil government and opened day schools; finally it had fostered morality by religious teaching of children, established the first native Protestant church in Alaska, and by its

initiative and petition led the Christian people of the United States to extend a helping hand to the natives of Alaska. (See Chapter XXI.) These deeds are not strictly military duties, and while they are extra-legal acts without warrant of law, they were justified by the law of emergency and impelled by the obligations of our higher moral nature.

As General Howard wrote: "The officers of the Army were denied the jurisdiction for an ordinary police, on the one hand, and held responsible for order and enforcement of the law on the other." Whether they did well or ill, at least they tried to do their duty in those early days.

Civil conditions after the departure of the Army cannot be recounted without a sense of shame. A pandemonium of drunkenness, disorder, property destruction, and personal violence obtained at Sitka, which eventuated in murder, followed by a threatened Indian uprising, and frantic appeals for protection that was temporarily accorded by a British man-of-war.

The Signal Corps of the Army re-entered Alaska for scientific work and occupied twenty-nine different and well-distributed climatic stations, until their discontinuance was practically directed by Congress in 1884 as useless. The contributions to Alaskan knowledge by Ray, Murdock, Turner, Nelson, and Fish were the forerunners of extensive and valuable work by the various executive departments of the United States.

The second advent of the Army in Alaska arose from disturbed conditions connected with the so-called stampede to the gold placers of the Klondike. In the

summer of 1897 some 20,000 men came together on the shores of Lynn Canal, a country without law, without courts, without habitations, and almost without food resources. Mostly men of character, though with many reckless adventurers, all were animated by a single aim, to reach with speed the gold-fields of the Canadian Klondike, which could only be done by private transportation over almost unknown routes.

Conditions of hardship and lawlessness, of suffering and contention speedily arose, and the Army was turned to as the only power that could control and ameliorate the situation. Unwilling, as always, to obtrude its activities into the domain of civil government the Secretary of War acted promptly through a preliminary reconnoissance, which was sent to the upper Yukon via St. Michael. Two officers—Captain (now General) P. H. Ray, and Lieutenant (now Major) W. P. Richardson—were directed to investigate conditions and report promptly the lines and places of military operation best calculated to remedy matters.

In southeastern Alaska affairs steadily grew from bad to worse. Reports as to the number, character, and condition of the gold seekers near Skagway became so alarming, and complications regarding Canadian customs so involved, that the military district of Lynn Canal was established under Colonel (now General) T. H. Anderson with the 14th Infantry. As a matter of wise precaution Colonel (now General) G. M. Randall occupied the military district at St. Michael with the 8th Infantry. The presence of troops restored confidence, and affairs were discreetly and peace-

fully managed by the army until temporary and stable local government was organized by the miners.

In addition, reports of starvation conditions in the Klondike were circulated with such detailed assiduity by interested parties, that Congress appropriated large sums for the relief of the Klondike miners, but after considerable amounts had been spent for supplies and for reindeer transportation (an ill-advised scheme that did not originate with the army) the expedition was abandoned, as no necessity therefor ever existed.

Meanwhile Ray and Richardson were obliged to winter at Fort Yukon; their steamers, being unable to proceed farther owing to low water, landed there all their Dawson supplies. Soon a situation of great gravity arose in connection with some five hundred disappointed gold seekers, fleeing from Dawson, who arrived at Fort Yukon in straggling bands and found further travel impracticable.

All in destitute condition, and nearly all of them without money, they included in their number some of the most desperate men of the North ready for any enterprise. Unscrupulous leaders obtained possession of many of the guns, and conspired to seize and divide the stores, with the view of providing amply for themselves without regard to the commonweal.

Ray and Richardson were alone, without a single soldier, but they acted with daring promptness. Ray hoisted the American flag over the two depots of provisions, announced that he took possession of them in the name of the United States, and stated that they would be held for the benefit of all destitute persons.

An organization for the resolute defence of the stores was formed, and the battle was won. Awed by the firm attitude of the officers and by this display of Federal authority, the lawless element abandoned their plans, and the winter passed quietly.

This adjustment of a serious trouble without bloodshed was the forerunner of the Army's policy during the occupancy of the Yukon Valley by troops under Richardson at Gibbon, Rampart, and Circle in 1898. Assuming control in all emergencies, the Army extended assistance, afforded relief, discouraged violence, and when absolutely necessary made arrests and administered condign justice.

The opening of the Nome placers and the assembling there of some 18,000 adventurous and determined men, naturally led to difficult situations. In the absence of courts, of law, and of authorized civil government, the settlement of disputed points of current and financial importance devolved on the troops, who proved equal to the occasion. Disputes involving thousands of dollars were promptly decided by officers and the decisions peacefully accepted.

The most striking instance of Army methods in the interests of order was that displayed by a young lieutenant. Several hundred disappointed and idle gold seekers called a mass meeting, naturally not attended by the busy miners, for the understood purpose of vacating all miners' locations and throwing them open to the first—or in this case to the last—comers; a procedure that was certain to result in a miners' war. When the discussion ended and the resolution was to

be put, the resolute and clear-headed lieutenant, Oliver L. Spaulding, Jr., declared the meeting adjourned and dispersed the assembly with his squad of only seven soldiers. This ended claim-jumping by mass meeting.

Under such emergencies the Army continued its alert and supervisory control over affairs, until Congress passed the Alaskan Civil Code and established courts at Nome and on the Yukon in 1900. This unauthorized exercise of general police authority over interior and western Alaska was not only accepted as indispensable for the security of person and property, but was also viewed as fully justified by the law of the frontier. Moreover, it was so impartially and judiciously administered as to give almost universal satisfaction, and, indeed, a desire for a return of military sway was not infrequently heard during the first unfortunate and stormy year of jurisdiction of the Federal court at Nome.

Commercially the greatest service rendered Alaska by the Army, was the construction and operation of a military telegraphic service, open to private telegrams, which brings every important business interest of the Territory in connection with the world. The system aggregates about 4,500 miles at present, and extends from Seattle via Sitka, Skagway, and Valdez to Nome in the west and to Eagle on the Canadian frontier in the east. (See Chapter XXVII.) These lines are due to the acumen of Secretary of War Root in approving the plans and securing the money, especially for the Seattle-Skagway cable; to General G. M. Randall for urging the system and very greatly facilitating con-

struction work by the line of the Army, and to the activities and energy of the men and officers of the Signal Corps, of which the writer was the Chief, during the four critical years of construction and installation. This system has made modern Alaska possible, as without it not one-quarter of the present business could be satisfactorily and economically done. The extent and importance of the service may be judged from the fact that the tariffs on private telegrams amount to about $250,000 annually, while government telegrams amount to at least $100,000 additional in tariff value. (See Chapter XXVII.)

The invaluable services rendered by the Army road commission are considered in Chapter IV.

In exploration the Army began early and did much. Raymond fixed the boundary line of the upper Yukon in 1868, which checked Canadian aggression and caused the abandonment of Fort Yukon. He also made a valuable map of the Yukon Valley, having determined astronomically several points therein. Ray during his notable service at Point Barrow discovered the Endicott Mountains in 1882, and the next year Schwatka traced and mapped the Yukon from its source to the sea. Later Abercrombie and Glenn did work of importance with Prince William Sound and Cook Inlet as their bases. Of geographic work done by the Army, Brooks states that the expedition of Lieutenant H. T. Allen, from March to September, 1885, "was one of the most remarkable in the annals of Alaskan explorations," being provided with few men, an inadequate equipment, and at times in a half-starved condition, as

Pt Barrow
Icy Cape
SIBERIA
BERING STRAIT
NORTON SOUND
KODIAK I.

Relief

ALASKA
TELEGRAPH AND CABLE LINES
constructed by the Signal Corps U.S.A.
under the direction of
Brig General A.W. GREELY, Chief Signal Officer U.S.A.
prepared under supervision of
Major GEORGE P. SCRIVEN, Signal Corps U.S.A.
1904
Scale: 1 to 1,600,000 Vertical Scale 10 times larger
Modeled by E. E. Court.
Washington D.C.
BRITISH
COLUMBIA
Ogilvie
Stewart River
Fort Selkirk
Five Fingers
Big Salmon
Kakina
Kalvin
Telegraph Creek
Iskoot
Echo
OF ALASKA

ka.

they were dependent on the country for food. Brooks adds:

No man through his own explorations has added more to a geographic knowledge of interior Alaska than Lieutenant Allen. Throughout his journey he made careful surveys and noted all facts which came within his observation; and within one season he made maps of three of the larger rivers (Copper, Tanana, and Koyukuk) of the Territory, which, until accurate surveys were made twelve years later, were the basis of all maps. His reports are the work of a careful, painstaking observer.

The forces of the army now in Alaska consist of one regiment of infantry and two companies of the Signal Corps. Two companies of infantry are stationed at each post, namely: Fort Davis, at Nome; Fort Egbert, at Eagle; Fort Gibbon, at Tanana; Fort Liscum, near Valdez; Fort St. Michael, on St. Michael Island; and Fort William H. Seward, at Haines, near Skagway. The men of the Signal Corps are in charge of the widely distributed telegraph stations, from Nome to Skagway and from Sitka to Eagle.

Duty in Alaska is confining and restricted to the post, except that done along the military telegraph system. While it is monotonous and irksome, it has been performed in such a manner as to elicit general commendation from the inhabitants. Under the law the army has unique and embarrassing duties devolved on it, as in Alaska (and nowhere else) it is subject to the call of the governor (or courts) as a *posse comitatus;* again, officers of the army are liable to jury duty, and have even been summoned to either pay or work out a road tax.

On several occasions in recent years the army has been ordered to quell disturbances, guard property, and protect lives. Fortunately in these cases of labor strikes and of civil disturbances, the obligatory and efficacious services of the army have been free from measures of violence.

In season and out of season, the officers of the army have proclaimed the obligations of the United States toward the natives of Alaska; and in default of an authorized system and in the absence of civil officials have assumed the difficult task of conserving, as far as possible, the interests and rights of the natives. (See Chapter XX.)

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CHAPTER VI

AGRICULTURE, FORESTRY, AND RESERVATIONS

As on other points, there have been advanced optimistic and pessimistic views on the possibilities of successful agriculture in Alaska. On this subject various official reports and many verbal statements have been considered, which are supplemented by personal observations over a great variety and extent of country.

Agriculture as a whole is valuable in Alaska solely for the purpose of supplying the local market, and that in part only. There are a few successful farmers, all in well-chosen localities in the vicinity of towns of considerable size. On the outlying islands, such as Baranof (Sitka), and at Kenai, grain is a failure except when cut for hay. At Sitka, while potatoes do well for some years they fall off in size and quality, and other vegetables are only raised with care and in favorable seasons. At Kenai the cattle live exclusively on the native grasses, which are sweet and nutritious. Butter and cheese are there made, but the demand is not equal to the supply. Stock raising is practicable to a limited extent on the southwestern islands.

As one enters the valleys of southern Alaska, from Cook Inlet or Prince William Sound, the agricultural possibilities materially improve. Potatoes and other vegetables do well, but as a rule grains fail to ripen and

are valuable for stock only. In the interior forage costs from twenty cents a pound upward, and is sold by the ton f. o. b. at prices ranging from six to twelve cents per pound, so that in some localities such crops pay largely.

As one goes north in Copper Valley conditions are more favorable for vegetables and native hay, and quite a number of good gardens or small farms are now cultivated, some as homesteads. The growing season, six months or more in the islands and in the inlets of southeastern Alaska, decreases to five months at Skagway, and is about four in the interior valleys. Although the period between killing frosts in the interior is considerably shorter than in the islands (Sitka, etc.), yet in the northern valleys there is not only much more sun, but there is also a much greater summer heat, due to the longer hours of sunlight, less cloudiness, and dryer atmosphere.

While the Seward Peninsula and the Arctic coast have no agricultural possibilities, yet considerable parts of the Yukon basin are suitable for gardening to a degree astonishing to the uninformed. The best-known instance of successful farming is that at the Holy Cross Mission, on the Yukon, in 62° N. Here cattle have been raised for ten years or more, and the products of the forty acres of land under cultivation excite surprise in every visitor. All through the valley of the Yukon potatoes and other vegetables mature, when proper ground is chosen and skilled attention given.

At Fort Gibbon, at the junction of the Yukon and the Tanana, and at Fort Egbert, on the international

Home Gardening at Fairbanks, Tanana Valley.

boundary near the Arctic Circle, the military garrisons have raised large quantities of vegetables, potatoes being especially successful. Even in the Koyukuk Valley similar conditions obtain, and at Coldfoot, within the Arctic Circle at 68° N., potatoes, cabbages, turnips, rhubarb, etc., are grown of large size and good flavor.

Truck gardening and hay farming are flourishing industries in the lower Tanana Valley, where it is claimed that 30,000 acres of land have been homesteaded. While grain will ripen only under favorable conditions, potatoes with other vegetables do very well, and the native and selected foreign grasses are productive of good crops. With baled hay at $80 to $100 per ton and imported potatoes costing from 6 to 8 cents per pound, the Alaskan gardener has a stimulus of certain profit.

That the productivity of Alaskan agriculture is important both in quantity and in value is clearly indicated by the diminution in the shipment of potatoes from the United States to Alaska, which dropped from 211,215 bushels in 1906 to 167,033 bushels in 1908. Meanwhile, the values of all vegetable shipments fell from $696,928 to $483,855, a decrease of more than thirty per cent. During the same period the quantity of imported hay fell from 10,405 tons to 9,165 tons, though the number of stock increased.

At Rampart, on the Yukon just south of the Arctic Circle, is located an experimental station under the United States Department of Agriculture. Grain has there ripened six consecutive years, four kinds of winter grains living and maturing, though the winter

temperatures touched —70°. Potatoes, cabbage, peas, etc., all thrive without much care.

As to berries, nearly the whole Territory produces numerous edible varieties, which for size, color, and flavor are unsurpassed.

Flowers of great variety and exquisite beauty seem to spring up everywhere in the short summer. John Burroughs writes: "At the mountain's [St. Elias] base the columbine, rock-loving as at home, but larger and coarser flowered, was in bloom, and blue violets could be gathered by the handful. Back of the encampment [Yakutat Bay] were acres of lupines just bursting into flower. At Orca wild flowers—yellow, white, pink, purple—were everywhere. Such flowers as we gathered! The colors were all deep and intense."

FORESTS

The importance of conserving the forestal wealth of Alaska was promptly recognized, and the policy of establishing national forests has been adopted. The Chugach forest, with its area of about 830 square miles, includes practically all the valuable timber in the Prince William Sound region and on Afognak Island. The larger national forest, Tongass, with an area exceeding 1,000 square miles, is situated in southeastern Alaska, where the cedars and other very valuable timber of the mainland and Alexander (or Sitkan) archipelago are brought under national control. It includes the mainland south of Unuk River, Chichagof, Kupreanof, Prince of Wales, and adjacent Islands. While timber from these forests cannot be exported from

Timber in the Chugach National Forest, near Cordova.

(Along Copper River Railroad.)

Alaska, yet the regulations permit local lumbering under liberal terms as to price and utilization.

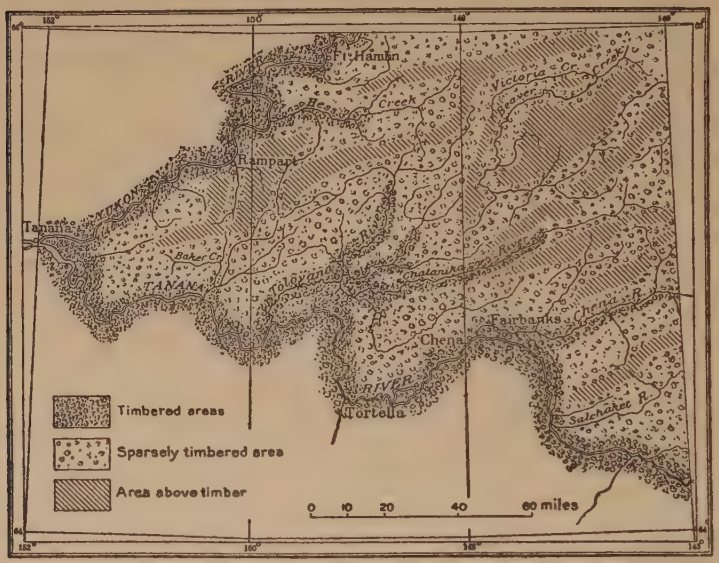
The ordinary tourist who visits the Sitkan archipelago gains an exaggerated idea of the value of the Alaskan forests, while the miner of the practically treeless Nome region is equally ill-informed as to Alaskan woodlands.

The treeless wastes are the Aleutian Islands, the south half of the Alaska Peninsula, the Yukon Delta, and the mouth of the Kuskokwim, the west half of Seward Peninsula, and the coasts for a hundred miles inland from Bering Strait and the Arctic Ocean. Excepting the glaciers and high mountain summits the rest of Alaska may be called wooded.

The true forest with valuable timber is confined almost exclusively to southeastern Alaska, and to the immediate coast region from Yakutat Bay westward to Alaska Peninsula. As one travels north from Seattle the conditions change slowly in British Columbia, and along the Alaskan coast to Yakutat Bay. The forest consists very largely of hemlocks (coast and alpine) and spruce, with considerable elder, willows, and cottonwoods, some yellow cedar, a sprinkling of red cedar, and probably a few other straggling species. The scanty depth of soil often distorts the tree's growth, so that it makes inferior lumber, though spruces are occasionally found that are from five to six feet in diameter and upward of 150 feet in height. In the Prince William Sound region the other species gradually fail, the hemlock last, leaving the spruce dominant and almost alone from Cook Inlet to the westward.

A well-known writer, in a misleading and erroneous article, has lately said:

Alaska is the great timber reserve of the continent. Trees of such size and commercial value exist nowhere else in such numbers and extensive areas.



MAP NO. 1—DISTRIBUTION OF TIMBER IN THE TANANA-YUKON REGION

The sound and conservative view as to its economic importance is set forth by an authority, Professor Fernow, who writes:

That the value of this forest resource must increase with the development of the country needs allow of no doubt; as a field of exploitation under present economic conditions, however, it does not offer any inducements, unless it be that the spruce could be turned into paper pulp.

As a matter of practice it may be said that all lumber for permanent use, even in Alaskan coast regions, is imported from Puget Sound, local saw-mills being unable to compete, price and quality being considered.

The interior of Alaska is largely wooded, and though the spruce is the most numerous species there are large quantities of hemlock, birch, poplar, cotton-wood (or aspen), alder, and willow. The Tanana Valley has almost inexhaustible supplies of poplar, spruce, hemlock, and birch, and in the lower valley considerable tamarack. Thousands upon thousands of cords of wood are transported for steamboat fuel from the densely wooded shores of the Tanana to the barren Yukon delta. While there are enormous areas densely wooded in the Tanana Valley, yet the timber near the mining camps is rapidly disappearing. The interior limit of timber elevation is unusually high, some trees being found nearly five thousand feet above the sea.

The general distribution of the interior forests is along rivers and adjacent lowlands, as is indicated by the accompanying map of woodlands in the Yukon-Tanana region.

While there is considerable timber in the vicinity of Fort Gibbon, in the central Yukon Valley, yet the far greater part of the trees are of very moderate size. Several years since an army contractor had difficulty in obtaining within seventy-five miles of the post a not very large number of sizable logs.

In the lake region between Cook Inlet and Bristol Bay there are well-timbered areas with considerable large spruce, some said to be over three feet in diameter.

The eastern part of Seward Peninsula and the adjacent shores of Norton Sound are fairly covered with spruce. The Kobuk Valley is quite heavily timbered with birch and cotton-wood, and Stoney reports large spruces, one being sixty feet long with a butt diameter of sixteen inches. The Susitna is well timbered, principally with spruce. The Kanuti Valley also has considerable forest areas, as well as the Tozi and the Koyukuk, the latter especially in the lower reaches where there are many large trees. The Porcupine has a dense growth of birch, spruce, and cotton-wood. On the arctic slopes of Endicott Mountains and to the west of Colville River there is much timber, though of stunted growth and rapidly decreasing toward the ocean.

In short, there are few extended areas in the interior of Alaska where timber fails to amply meet the wants of the miner or settler.

RESERVATIONS

Under Executive Orders there have been established many reservations for public purposes, of which the following are the most important. The War Department controls sites for military posts, for military telegraph stations, and as fuel reserves. Among these stations are Forts Davis, Egbert, Gibbon, Liscum, St. Michael, and William H. Seward: also about thirty telegraph offices, and a telegraph right of way between Valdez and Nome. The Navy Department has Kiska Island, and naval grounds at Sitka. The Light-House Board controls certain lands for occupancy for light-houses and their keepers. The United States Bureau

of Fisheries has a sea-otter reserve on Afognak Island, and the Bureau of Education a reindeer station on St. Lawrence Island. The Department of Agriculture in addition to experimental stations at Sitka, Fairbanks, Kodiak, and Rampart for developing the agricultural possibilities of Alaska, also controls certain reservations for the preservation of mammals and birds. The moose reserve is on Fire Island, Cook Inlet, and the bird reserves are at St. Lazaria Island, Sitka Harbor; Bering Sea—Hall and St. Matthew Islands; Tuxedni—Chisick and Egg Islands, Cook Inlet; Bogoslof—Bogoslof and Grewingk Islands; Pribilof—Walrus and Otter Islands; and the Yukon Delta—Nelson Island, and the tundra between the Yukon and Kuskokwim, west of 162° 20′ W. The Department of Commerce and Labor controls the fur-seal reservation of the Pribilof Islands. Under the Act of March 3, 1891, Annette Island, was set aside for the Metlakatlas and other allied natives.

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CHAPTER VII

MINING IN GENERAL—GOLD, COPPER, AND COAL

In connection with the mining industries of Alaska, very brief though inadequate allusion is made to the United States Geological Survey, both on account of its intimate relations with mineral products and also for its invaluable labors in the interests of the Territory. Its able officials have made geologic reconnoissances in Alaska covering about 100,000 square miles, topographic surveys of about 120,000 square miles, and hydrographic studies covering some 2,500 square miles. The results of such surveys have been incorporated in fifty or more separate publications, which cover the subjects and areas under consideration with such fulness, practicality, and accuracy as to elicit the highest commendation. These volumes have been most beneficial to the mining public, and are invaluable to all Alaskan interests. It may be added that practically all the data now discussed have been drawn from the official publications of the Geological Survey.

While the importance of mining in Alaska is well known, its great extent is illustrated by the following statement of Mr. A. H. Brooks, an acknowledged authority:

It is estimated that during 1908 there were about 770 productive placer mines in Alaska, employing about

Placer Mining on Ester Creek, near Fairbanks.

(Washing up the dump, or frozen gravel, mined in winter.)

4,400 men. In the same year there were 12 auriferous lode mines and 9 copper mines on a productive basis, giving employment to about 2,000 men. In addition there were probably about 4,000 men engaged in prospecting and in dead work in connection with mining enterprises.

Alaska is the latest region to enter the list of mineral-producing countries of the world. It is but seventeen years since, in 1892, Alaska excited a faint and transitory interest by passing the million-dollar mark in gold productivity. When in 1900 the despised Seward Peninsula, which in 1899 contributed only three per cent. of the Territory's mineral output, produced by itself more gold than all Alaska had yielded the year preceding, the world turned its attention for a moment from South Africa and the Klondike to the barren shores of Bering Sea and its wondrous wealth of golden sands. A similar diversion of interest occurred when the gold production of the Yukon basin (the Fairbanks district) more than quintupled from $1,300,000 in 1904 to $6,900,000 in 1905.

In speaking of the mineral resources of Alaska, one has in mind only the gold production, as the output (in round numbers) of $148,000,000 from 1880 to 1908 inclusive, consisted of $142,000,000 gold as against $4,100,000 (less than three per cent. of the total) in copper, $1,150,000 in silver, and less than half a million of dollars in coal, tin, marble, and gypsum.

The following figures show the more important increases in the total mineral output for various years: 1898, $2,585,575; 1899, $5,703,076; 1900, $8,238,294;

1904, $9,567,535; 1905, $16,478,142; 1906, $23,375,008; 1907, $20,887,055; and 1908 $19,929,800.

The earliest gold production recorded was in 1880, $20,000, from the Juneau region, which district held the supremacy until its yield of $2,152,000 in 1899 was surpassed that year by the Seward (Nome) Peninsula's output of $2,800,000. Nome gave way in 1905 to the Yukon Basin (Fairbanks) yield of $6,900,000, which district has since held the palm. The annual gold production of the four great districts from 1880 to 1908 included is shown in Table 3.

The copper mines of Alaska are in their initiatory stage of development, the only productive operations being confined to Prince of Wales Island and Prince William Sound. The extension of railway facilities up the Copper Valley in 1908 opens up the valuable and extensive deposits of the Kotsina-Chitina region. Within the next few years the copper production will very largely increase.

The coal deposits of Alaska are extensive, widespread, and of very great value, there being known coal fields of an area of 12,600 square miles. To prevent monopoly President Roosevelt withdrew coal lands from location and by regulations of April 12, 1907, authorized entries in limited quantities.

On this subject the Commissioner of the General Land Office says:

> These withdrawals were occasioned by the widespread belief that public coal lands were being improvidently disposed of, and that they were even falling into the ownership of corporations able to control the output of the mines and fix their own prices on the product.

To the present time the amount of the coal mined in Alaska has been nominal, the output of 1897, with its value of $28,000, being the maximum. Mines are worked for local use on Alaska and Seward peninsulas and at Bering Lake. The important coal veins of the Controller Bay region are in process of development, and much prospecting has been done in the promising Matanuska coal belt. Although lignite is mined and largely used on the Canadian Yukon, yet it has been neglected on the Alaskan River and displaced by oil. The extensive and high-grade coal deposits of the Controller Bay and Matanuska fields are without reasonable doubt destined to furnish fuel for the entire Pacific coast region.

The petroleum fields of Cook Inlet and Controller Bay are practically in the non-productive stage of development, though the Katalla wells furnish petroleum fuel for local construction work in that region.

Deposits of antimony, graphite, iron, quicksilver, and tungsten have been found, but as yet not in such quantities or under such conditions as to make their development profitable.

The tin mines of Seward Peninsula are still in process of development, there being but two mines in operation, with a maximum output of $38,640 in 1906.

In 1906 the placers yielded 84 per cent. of the gold, and the gold silicious ores 16 per cent.; the copper-ore production was only four-tenths of one per cent. In 1908 the preliminary statement of the United States Geological Survey shows a marked change, though possibly of a temporary duration, since the production

from the gold silicious ores had risen to 19 per cent., and that of the placers correspondingly decreased.

Interior mining is done under great disadvantages of severe climate, short season (about four months each year), costly transportation, insufficient water, expensive fuel, frozen ground, and uncertain labor. These adverse conditions particularly affect placer mining, which produces about 85 per cent. of the gold output. Along the southeastern coast, however, where transportation is rapid, freights low, and fuel comparitively cheap, mining operations are conducted at a minimum cost, as is illustrated later in the account of the Treadwell mines (Chapter IX).

The costly, elaborate plants which are found in all rich placer districts make Alaska a rich man's country. Bonanzas are exceedingly rare, and to an increasing extent the product comes from mines operated by men of considerable capital. In general the cost of production is double what it is in the United States proper. During nearly eight months of the long winter the demand for labor is very greatly reduced in the Yukon Basin and on Seward Peninsula, which causes thousands of men to leave each autumn for the "outside," with a consequent uncertainty of their return the following season. With constantly changing force and the necessity of using much new and untrained labor, the situation has been aggravated in some years by labor strikes. As the extended journey out and back from Fairbanks costs about $200, and entails a loss of time exceeding a month, the enhanced cost of production is

obvious. Mining industries in southeastern Alaska are almost entirely free from these disadvantages.

Cheaper, more rapid transportation, and less costly fuel are the two great needs for the further development of placer mining. Coal costs about a cent and a half per pound on Seward Peninsula, and at Juneau its price has risen to such a point that it is being rapidly replaced by oil. With improved conditions and reduced rates of transportation there must be an enormous increase in the mineral output of interior Alaska, where present prices are prohibitory of any mining, except of the richest ground.

Bibliography.—Mining Industry in Alaska. Bulletins, United States Geological Survey; 1905, No. 284; 1906, No. 314; 1907, No. 345; 1908, No. 379. Brooks: Mining and Mineral Wealth of Alaska, 1909.

CHAPTER VIII

KETCHIKAN AND WRANGELL MINING DISTRICTS

Mining interests in the Wrangell district began with the opening of the placer workings on the bars of Stikine River in 1862, but they did not assume a serious aspect until the attention of the world was drawn to the Klondike discoveries of 1896. The official headquarters of the district, Fort Wrangell, for nearly a century was known successively as a Russian station, a Hudson Bay trading post, and a military post for United States troops. With a population of nearly one thousand, including natives, its local lumber and canning industries are supplemented by its trade relations with the Canadian miners in the Cassiar district and also with the various mineral operations in adjacent American camps. Being on the line of semi-weekly steamers from Seattle to Juneau, it is the natural transshipping point for the mines tributary to the Stikine River, and in connection therewith a river steamer makes regular summer trips as far as Telegraph Creek, 170 miles up the Stikine.

The Wrangell and Ketchikan mining districts are here treated together, as they originally formed one district and were divided in 1901 by order of the United States Supreme Court, in order to facilitate the transaction of business connected with recent mining

developments at Ketchikan. The Wrangell district has as its northern limits Frederick Sound and Chatham Strait, while the Ketchikan district is bounded on the north by Sumner Strait and Ernest Sound and on the south by the international boundary. Two-thirds of the land areas, and even a greater portion of the valuable mineral deposits were thus transferred to the new district, which is now the more important of the two.

Apart from its mining interests, which naturally centre there as the official head-quarters, Ketchikan is an incorporated town of about 1,300 inhabitants, with quite extensive business interests. It is by law the first port of call for all steamers doing business with southeastern Alaska, which are required to here make entry of cargo and passengers. It has two good hotels, several large outfitting stores, canneries, a fish-plant, saw-mills, and is the commercial distributing point for adjacent regions. It is well provided with educational and religious institutions; has waterworks, electric-light plants, telephonic service, and other modern equipment. Picturesquely located, with its famous salmon stream and forested hills, Ketchikan is an attractive place. Built with some difficulty, owing to the broken, hilly ground, it has an excellent system of board walks and roads, most creditable to the town. By almost daily steamers in summer, and semi-weekly in winter, Seattle is reached 660 miles to the south and Juneau 240 miles to the north. Local lines of steamers run with some regularity to Port Simpson, up the Skeena River, and to Prince of Wales Island.

The Ketchikan mining district comprises Cleveland

Peninsula, the mainland between Portland and Behm Canals, the important islands of Prince of Wales and Revillagegido (on which the town of Ketchikan is situated), and contiguous islets.

The most valuable ores are copper, and the only copper-producing mines of southeastern Alaska are in this district. Before 1905 the output, with by-products of gold and silver, aggregated about $200,000. Extended mining operations were then initiated and the values reached from six mines $339,000 in 1905, and from ten mines $920,000 in 1906. The average value per ton for two years was $10.80, and estimated output $840,000 in 1907. The decrease in the production for 1907 was due to the general depression in copper trade throughout the world, which rendered the mining of low-grade ores unprofitable in Alaska, as elsewhere. The general richness of the Alaskan copper mines, however, stimulated capitalists to extended operations in their development throughout the district. In all Alaska fifteen mines made shipments of copper in 1907 as against fourteen in 1906, ten being in southeastern Alaska, and there was increased activity in prospecting. Naturally the depression of the autumn of 1907 temporarily closed many mines.

The centre of copper-mining activity is Prince of Wales Island, where the earliest important developments were on the west coast, at or near Hetta Inlet, in the Copper Mountain, Jumbo, Red Wing, and Corbin mines. At Copper Mountain a 250-ton smelter was constructed and operated, while long tramways and wharves were built at Niblack, Skowl Arm, Karta Bay,

Hetta Inlet, etc. Saw-mills and shops were erected and operations were usually by power, steam, or water.

Later there were very valuable deposits developed on the east coast, on and near Kasaan Peninsula, for which a smelting plant of 350 tons capacity was built and operated at Hadley, which has become a considerable centre. In 1907 there were thirty or more copper mines in process of development or operation on Kasaan Peninsula, which had become the principal copper-producing region of Alaska. The most important of the developed mines are those operated by the Brown-Alaska, Hadley-Consolidated, Mount Andrew, and Rust and Brown mining companies. There are other copper mines, promising or producing, on or adjoining Karta and Tolstoi Bays, Moira Sound, Skowl Arm, and also on Gravina Island opposite Ketchikan.

While the low price of copper caused several mines to suspend operations during 1908, yet there was an output of about 2,000 short tons of copper.

The ultimate success of copper mining in Alaska, as indeed elsewhere, depends on large preliminary expenditures of an unproductive character, both in the mine itself and also in necessary plants. Even in the richest mine dividends are the outcome of judicious expenditures and of an able, economical administration.

Regarding silver, lead, and zinc it may be briefly stated that they are not plentiful in Ketchikan or Wrangell districts, and efforts for their development have been hitherto unprofitable.

But few of the numerous gold prospects in Ketchikan district have developed to the producing stage. Many

are at present unpromising, as profitable working depends very largely on nearness to tide-water to insure cheap transportation, and to water-power for economical operation. The gold ores are largely free-milling, and are most advantageously treated in stamp mills by amalgamation and reduction. Lode ores are present in greater quantity, as well as the lower-grade vein ores; both types are mined with profit under skilled and economical management. Promising gold prospects have been located at Thorne Arm, George Inlet, Tongass Narrows, and Kasaan Bay, while small and increasing profits are being made at favorable mines on Cleveland Peninsula, Revillagigedo, and Gravina Islands.

A new industry of southeastern Alaska pertains to building materials, the non-metallic minerals of cement, gypsum, clay, and granite being widely distributed. Marble quarries have been located and opened at various points on Prince of Wales Island, though very promising deposits are elsewhere in process of exploitation. The most extensive operations have been made by the Alaska Marble Company, whose quarries near Shakan have been worked since 1905. They have ample installation and plant in the shape of a gravity railroad, dressing and cutting machinery, with suitable shipping facilities. The importance of the industry is shown by the increase of shipments of marble and gypsum from $11,995 in 1906 to $71,958 in 1907, and yet greater in 1908.

Not only are the deposits most extensive in distribution and practically inexhaustible in quantity, but the

marble is of the best quality. It is free from silica and flint, takes the chisel readily, presents a beautiful surface, and has an average crushing strength of over ten thousand pounds. The main deposits are of three varieties, pure white, light blue, and white with blue veins, some of the colored marbles being unexcelled by the finest Italian products.

The only known gypsum deposit is that of Chichagof Island which is largely developed, its output in 1906 being valued at $17,500.

Granite of good uniform color and in favorable location has been noted, but its development is not yet attempted. Mr. Wright, the geologist, estimates that granite can be quarried in the Ketchikan district most reasonably, while the freight to Puget Sound is very moderate.

In general it may be said that the future of mining in the Ketchikan district, especially of copper, appears certain of steady and extensive development. While its plants are necessarily costly, its labor uncertain, and competition threatening, yet the availability of water power, the richness of the deposits, facility of working, and cheapness of transportation are factors that should insure its continued prosperity.

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CHAPTER IX

THE JUNEAU SECTION

The oldest American settlement in Alaska is Juneau, and it has the most evident signs of that permanency which casual visitors are fond of denying to Alaskan towns. As the capital of the Territory, the metropolis of southeastern Alaska, and the centre of mining operations, Juneau was properly named for Joseph Juneau, whose discriminating eye and mining skill discovered the quartz and placer riches that have made this region famous.

Dominated by Mount Juneau, against whose background of sheer 3,000 feet the town is outlined as seen from the sea, the capital city is picturesque and interesting. The adjacent coasts of the Alaskan mainland are so steep that the average rise from the sea is about one foot in ten, while mountains a mile high are not unusual within five miles of the ocean, and even nearer in extreme cases. Juneau is built on the slope of a steep mountain, and within its limits there cannot be found a naturally level spot 100 feet square. Its prominent court-house is perched on the top of a high hill. The streets are necessarily winding in some places and in others rise sharply and in terraces, one above another. The roadways are plank-covered, and many vine-clad or flower-embowered cottages are

reached by gray-mossed stairways. Altogether sight-seeing is a vigorous and necessary exercise, for horses are few in Juneau.

With good hotels, indifferent variety shows, excellent restaurants, well-stocked curio shops, Indian basket pedlers, and a hospitable community, the town affords all comforts and many luxuries to visitors. For its residents there are schools, several churches, good markets and shops, a fine water supply, electric lights, an efficient telephone service, and cable connection with Seattle.

Moreover, Juneau is the commercial and supply centre for adjacent mining camps; has banks, assay offices, transportation facilities, hospitals, and other institutions. Here live the governor and other Federal officials for the transaction of judicial, administrative, and mining business. Two daily papers keep march with the world's progress, the chamber of commerce discusses trade and other public matters, the women assemble in their clubs, the few sick (for all Alaska is phenomenally healthy) are well cared for in hospitals, the children are in well-taught schools, the library is fair, and the community is hospitable, orderly, and enterprising. In ten visits there have been experienced no importunity by beggars, no affront from the mythical border ruffian, and no offensive drunken scenes or street disorders. In short, Juneau is a well-governed, intelligent, thriving, self-respecting town, with a population varying between two and three thousand—from summer to winter.

In addition to being on the through line of travel

from Seattle to Skagway and to the upper Yukon, Juneau is the point of departure for the westward—to Yakutat, Cordova, Valdez, Cook Inlet, Kodiak, Unalaska, and in summer to Bristol Bay. Adjacent mining camps, canneries, etc., are reached by local steamers —all travel in these regions being by water.

The Juneau gold-bearing areas extend along the mainland from Port Houghton to the head of Lynn Canal, and include the outlying islands, such as Douglass and Admiralty.

The Juneau mining industries owe their birth to placer and quartz discoveries made by Joe Juneau and by Richard Harris in 1880, the first ledge located being now worked by the Alaska-Juneau Company in the Silver Bow region.

LODE MINING

The centre of quartz mining is on Douglas Island, where the operations of the famous Treadwell group of mines are conducted. The great Treadwell mining plant, with one exception the most extensive in the world, is the outgrowth of a prospector's location in 1881, which has developed a mill of 180 stamps in 1887 to an enormous system with workshops, concentrators, etc., and 880 stamps, of which 780 were in operation in 1907. Nine-tenths of the gold production in southeastern Alaska is from Douglas Island. Of the five great mines on Douglas Island, the Alaska-Treadwell Company own the Treadwell; the Alaska-Mexican Company the Mexican; and the Alaska-United Company the Ready Bullion and Seven Hundred Foot, the

last named being leased to the Treadwell Company. An excellent account of these mines is to be found in Curle's "Gold Mines of the World," second edition, 1902; while a valuable treatise on the methods and statistics, written by the superintendent, A. H. Kinzie, has been published in "Transactions of the American Institute of Mining Engineering," Vol. V, p. 34.

The salient and interesting features of the Treadwell operations are, first, their practical continuity, day and night, every day in the year except Fourth of July and Christmas; and, second, that the material is low-grade ore which contains on an average in late years, with much very low-grade output, only a little over two dollars to the ton. It is a matter of interest that the lower veins, nearly 1,000 feet below the sea level, produce ore that is practically unchanged in its milling value from the upper layers.

The ore output of the Treadwell to January 1, 1903, was 4,500,000 tons, which averaged $4.02 gold per ton in its values. The production to January 1, 1906, of the Treadwell mine was $17,359,811; of the Alaska-Mexican from 1894 to 1904, inclusive, $4,176,833; of the Ready Bullion and Seven Hundred Foot, 1898–1904 inclusive, $3,222,184; aggregating $24,758,184. The Treadwell outputs of interest are: annual average of 1891–1900, $738,049, ranging from $568,857 in 1898 to $1,153,367 in 1900; average 1901–1905 inclusive, $1,520,354, ranging from $860,736 in 1901 to $2,007,482 in 1905. All three yielded in 1908, $2,999,420.

In 1908 there were extensive improvements in the Treadwell mines, which materially increased its annual

output and reduced the unit cost. Labor troubles were adjusted, the Treadwell mine extended to the 1,450-foot level, the water-power was increased, and oil replaced coal as fuel.

Of these mines A. C. Spencer says:

> The mines of the Treadwell group have always been the only great producers in the district, and the methods of mining and milling here employed represent about the highest possible attainment in the successful working of low-grade ores under conditions which, though favorable, are not ideal.

As to the influence of the methods employed, and their extension to other low-grade lodes, Brooks adds:

> At the Treadwell group (long an object lesson as a well-managed enterprise) the average cost of mining and milling is now about $1.30 per ton. The installation of hydro-electric plants in a region of such extensive water-powers will do much, in connection with the low cost of transportation, equable climate, abundance of timber, and favorable topography, to permit the exploitation of low-grade ore bodies [whether gold, silver, or copper].

From 60 to 75 per cent. of the ores are free-milling, the gold being crushed and then collected by mercurial methods; the balance is gathered in concentrates, assaying from $30 to $50 per ton, and sent to the Tacoma smelter for reduction.

Around the mines have grown two cities, the miners' town of Treadwell and the commercial town of Douglas City, the two containing between three and four thousand inhabitants. A regular ferry affords easy

transit to Juneau, which is situated five miles or so away, under the mountain across the Gastineau Channel. The mines of Douglas Island are brilliantly lighted by electricity and its towns are prosperous and orderly. The miners in the main are Scandinavians or Finns, whose pay ranges from $2.50 for common laborers to $4 or more daily for skilled miners.

On Gold Creek, near Juneau, lode mining has been successfully conducted for many years, and the output has been quite large each year. The permanent success of such enterprises depends on large ore bodies rather than on very rich ores. Late developments in the Gold Creek region justify belief in the presence there of very extensive veins. The Ebner Company since 1881 has gradually increased its installation to 25 stamps. The Alaska-Juneau Company worked continuously its 30 stamps during the seasons of 1907 and 1908. The Alaska-Perseverance Company, which has lately developed great bodies of ore, raised its installation of 50 stamps to 100 stamps in 1907, and notably increased its output in 1908. The lode deposit was uncovered in 1908 to the extent of 1,500 feet in length, varying from 60 to 100 feet in width.

On Sheep Creek, near Juneau, is the Silver Queen group of mines, which, discovered in 1887, have been brought under one management. With a 30-stamp mill, bucket trams, railway, water-power, etc., it has been a steady producer. The yield to the close of 1903 was placed at $465,000. The working season, May 1 to early November, depends largely on snowfall and

water supply. Litigation, so common in Alaska, has hindered the development of the Gold Creek region.

North of Juneau, in the Lynn Canal region, there are many lodes located and under development, though slowly, especially in Montana and Yankee basins, Cowie, McGinnis, Windfall, and Salmon Creeks. At Peterson Creek a 2-stamp mill is in operation. On Eagle River operations have been steadily continued, and a 20-stamp mill was continuously working during 1907 and 1908. In the Berner Bay region most mines are tied up by litigation, but the Jualin Mine worked its 10-stamp mill during 1907, and had produced to 1907 about half a million of gold. Even larger amounts have been yielded by the Sherman group of mines in that locality.

South of Juneau the scattered mines are largely in the development stage—at Holkham Bay, Limestone Inlet, and on Admiralty Island. At Snettisham the installation and operation of a 5-stamp mill place it in the productive class.

The Sitka District

The Sitkan mines are in a separate district, but are here treated owing to their minor importance at present. Several gold mines have been operated near Sitka, but only the DeGroff Mine, where a 2-stamp mill is now operated, has reached the producing stage.

Sitka itself is most interesting, but its situation on the outer edge of the islands, which made it convenient to Russia, puts it at a disadvantage with other Alaskan towns. In 1867 it was the capital of Alaska, the head-

quarters of the military district and of the Treasury agents, and the recognized centre of Alaskan interests. The establishment of a mission with school and hospital, the location of an agricultural experiment station, its selection as the diocesan residence of Bishop Rowe, and the establishment of cable communication, all added to its importance, while its designation as a naval station, with marine garrison and coal depot, was thought to have insured its prosperity. Suffering from the diversion of trade, it is, however, gradually losing its commercial importance.

Neglected though it be by trade, Sitka is the most interesting Alaskan town for tourists from the southland. It is reached by the inland passage through winding channels, hedged in by emerald shores and fascinating islets that charm every lover of the beautiful and unusual.

The town itself has a striking background of mountains, which is greatly enhanced in attractiveness under the rays of the not too frequent summer sun. Westward one looks on a landscape made beautiful by the graceful blue slopes of volcanic Mount Edgecumbe, especially when from its extinct snow-filled crater there drift down alabaster streaks of newly fallen snow, or when a vanishing storm leaves its summit adorned by drifting bannerets of fleecy clouds.

The Bay of Sitka can scarce be equalled for scenery: in fine weather for its mingled softness of beauty and rugged picturesqueness, or on dark stormy days for its stern and sombre grandeur.

On shore first of all are the Indian curio women, with

varied wealth of articles—quaint, graceful, and original, or harsh, common, and barbaric, as runs the taste and judgment of the visitor.

Sitka Town presents few structures of interest beyond the moss-covered log buildings of a past age and former régime and the severely simple Greek church. Externally the church is a green-roofed, bulbous-domed building, with a clock-faced tower and sharp spire, attractive as a novelty to most tourists. Its interior and the furnishings appeal to every one appreciative of unusual art forms, or interested in either the method or the outcome of religious systems. To one class appeal the interior arrangements—the holy of holies, the screens, the silver-cased icons, the ancient vestments wrought of cloth of gold, and the artistic silver censers—all enhanced æsthetically by the external and surrounding simplicity of the building itself. In contemplative and susceptible minds, however, rise up holy memories of the Russian priest who furnished the church, Veniaminof, the combined St. Paul and St. John the Baptist of Alaskan natives. The consideration of such a life of consecration, devotion, and self-sacrifice is a benison to any soul.

Turning from Russian to American efforts, the road to other churches and to the Industrial Training School (see Chapter XXI) winds partly by the shore of the bay and partly by shady paths along Indian River through a park of charm and beauty. Indian River Park is so thoroughly sylvan and so unexpected in its aspects, as to be strikingly impressive. One looks skyward through tangled vistas of tall dark spruces,

fragrant yellow cedars, or sombre, graceful pines, and turns his eyes earthward to enjoy the dense flower-covered sward and extended patches of edible berries, in great variety. Meanwhile the ear is filled with the murmur of babbling brook or by sound of gentle waterfall, and gladdened by such melodious and full bird song as is rarely heard elsewhere in Alaska. Unfortunate the Sitkan tourist who has not been there favored by bright sun and these other delightful experiences, for he fell on evil days.

PLACER MINING

Lode mining is by far the greatest industry of southeastern Alaska, yet the day of placers and beach washing has not entirely passed. The placers of Gold Creek, which flows past Juneau, have yielded at least $1,000,000 to January 1, 1904, and the end is not yet. A third of this amount came from the Nowell placers in Silver Bow basin, where the installation of a hydraulic elevator and other improvements is expected largely to increase the output.

There are numerous placer claims in the Juneau gold belt that are either developing slowly, or are waiting for enough working capital to install modern appliances. Among these may be mentioned those at Holkham and Windham Bays, Salmon, Lemon, Nugget, McGinnis, Sheep Creeks, and possibly a few more, neglecting those that have been worked out under old methods, or been temporarily abandoned. The comparative unimportance of placer mining in southern Alaska is shown by

the output for 1907, $300,000 for all such mines from Ketchikan to Kodiak.

It should be added that placer mining is undergoing a marked revolution, progressing from the early crude methods, and by hand power, to the more effective application of well-equipped plants, operated by steam or water power. Placer mining by machinery is, however, scarcely less complicated and uncertain than lode mining. It involves a thorough knowledge not only of the difficulties attendant on all operations in Alaska, whether of climate, transportation, or labor, but also as to existent conditions as regards ground frost, gold content, unit cost, volume of alluvium, location of pay streaks, and depth of placer. It is beyond question that the installation of expensive plants without thorough preliminary tests as to these factors, accounts for the financial failure of many widely heralded and alluring enterprises.

Skagway Region

Placer mining is here in the process of development rather than in a profitable producing stage, though the Chilkat drainage basin promises well on Porcupine and Nugget Creeks. Installations have lately been made on the Porcupine to work systematically the extensive alluvial deposits that are known to exist there.

The black and ruby auriferous beach sands of the Alaskan coasts have been mined with moderate success, and on a small scale at Lituya Bay and at Yaktag.

According to Spencer, the mineral deposits in the immediate vicinity of Skagway are of such character

as to offer, at present, little encouragement for their further development.

The town of Skagway (see Chapter XVII) is the distributing point for mining operations in this region, both American and Canadian. Besides other Federal offices, the Alaskan Road Commission is here located.

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CHAPTER X

NOME AND THE SEWARD PENINSULA

With the word Nome nearly every American associates the idea of gold, Alaskan gold. In this the people are right, for the gold production of Seward Peninsula, the general name given to the Nome region, aggregated to 1908 the enormous sum of $50,000,000, a materially larger output than any other Alaskan district has yielded (see Table 3). Moreover, it is of interest that the earliest discoveries in Council district, on Ophir Creek, and in Nome, on Anvil Creek, yet hold their own as the largest producers. Indeed, they have yielded three-fourths of the gold values of Seward Peninsula—as shown by the outputs of three years, 1902–1904, $13,425,000, of which nearly sixty per cent. came from the Nome district and nineteen per cent. from Council.

The details connected with the increase of the gold output from $75,000 in 1898, to $2,800,000 the following year, and the growth in a single season of a mining camp of a few score men into a mushroom town of 18,000 or more, are not parts of this book, though the author was a Nome visitor in the fateful year of 1900.

Indeed, it would take volumes to tell the story, with its countless incidents whose true and graphic portrayal would exceed in thrilling interest the wildest romance of the age. Among these were the scheme of late

comers to overthrow by vote in mass-meeting all claims located by their fortunate predecessors; the active jumping of claims; the disputing of locations; the despair of thousands of hungry, disappointed men; the epidemic of typhoid; the home shipment of indigents; the impracticable mining machinery; the speculative schemes; the gold-brick mining companies; the camp dissipations; the displacement of the natives; the astounding discovery of the golden sands of the beach; the judicial system of receiverships with consequent ejectment of original owners and of their machinery from fabulously rich claims. These and more are parts of a history alternately comic and tragic, corrupt and straightforward, generous and hateful, disorderly and law-abiding. The sterling qualities of the American miner were never displayed to greater advantage than in the development and transition of Nome into a successful and permanent mining district, with so little of cruelty, dishonesty, and crime, at a minimum cost of human life and suffering.

PLACER MINING

Seward Peninsula is especially a region of placer mining, though the successful auriferous lode mining on Solomon River since 1903, and other favorable locations, points to successful lode exploitation on a large scale. Many think that Seward Peninsula is gold-bearing through its entire extent, not realizing that its area is about 22,700 square miles—larger than the combined extent of New Hampshire, Massachusetts,

and Rhode Island. It is already known that the area of auriferous gravels in the peninsula includes at least 210 square miles, equal to the entire placers of California. Of this immense Alaskan gold-bearing area only a small part has been thoroughly exploited, so that its gold possibilities must be enormously great.

From 1901 to 1905 inclusive, the total productivity of Seward Peninsula amounted to $22,555,000, distributed as follows: Winter drift, $2,050,000; Nome precinct, $13,620,000; Council precinct, $4,100,000; Kougarok, $640,000; Fairhaven, $825,000; all other mines, $1,120,000. The very rich placers found on the so-called third beach line raised the yield of 1906 to $7,500,000, and $7,000,000 in 1907. Their partial exhaustion caused the Seward production to fall to $5,100,000 in 1908.

Brooks on the subject of permanent development remarks:

> The first years were given to skimming the cream from some of the richest creeks. Such operations have been of little permanent benefit to the district. No placer camp whose output is derived solely from bonanzas ever has had or can have a long successful history.
>
> Far-sighted and experienced men realized that, by the installation of proper equipment, a reduction of costs was possible, which would make available for mining the large deposits of auriferous gravels carrying lower values.

Brooks estimates the total productivity at values ranging from $250,000,000 to $325,000,000 for the placer mines only, and that the process of production

will, at the present rate, last from twenty-five to forty years. Summing up, he writes:

> These speculations as to the life of the placers of Seward Peninsula are too indefinite to have much value, but they suggest at least that the gold production will probably increase rather slowly and that the outlook is favorable for a long period of rather uniform output.

Methods and conditions have radically changed since the pioneer days of 1899. Instead of earning from $1 to $1.50 per hour for work with pick and shovel, men are now content with $5 to $6 per day and board. Coastal freight has been reduced from about $20 per ton each hundred miles to half that amount, and overland transportation has fallen from a cent a pound per mile to one-third that amount under favorable conditions. With increasing mileage of railways freight runs from $2 to $3 per ton each mile, and is sometimes even less.

All placers are not rich and the gold is usually fine, though nuggets are occasionally found—the largest, weighing 182 ounces, valued at $3,285, being from Anvil Creek.

Under sluice-box and shovel methods, ground producing less than $1 per cubic foot could not be profitably worked. In consequence modern methods have introduced the dredge, scrapers, steam shovels, grizzlies, steam thawers, hydraulic elevators, and pumping plants. By such appliances ground producing 25 cents per cubic foot can be worked, if in quantities.

The gold-bearing area of Seward Peninsula is divided

into five principal mining districts: Nome, Council, Fairhaven, Kougarok, and Port Clarence, shown by the accompanying map.

Nome District

Nome City is the commercial centre of Nome district, which includes the southwestern part of the peninsula.

MAP NO. 2—MINING PRECINCTS OF SEWARD PENINSULA

The most astonishing yield of this region was from the ruby beach sands, which in two years produced gold to the value of $2,000,000. The richest placers have been those of Anvil Creek, which, yet productive, had an output of more than $6,000,000 up to 1905. Of this more than $1,000,000 came from an area one-tenth of a mile square. Very rich placers

were found on the three beach lines, two ancient beaches being far from the sea, each producing several millions of dollars. These deposits have been worked as to their richest ground, but with more economical methods both the beach sands and the beach lines will yet yield largely when again worked over.

Council District

The Council district, including the southeastern part of the peninsula, centres in Council, which is reached by rail and road. The railroad from Solomon (Dickson) extends to Penelope Creek, distant about thirty miles from Council, on the Niukluk River. While Nome is in untimbered country, Council is in a region of spruce forests. The richest placers are those of Ophir Creek, to the north, which are reached by the Wild Goose Railway, seven miles in length. With its tributaries, the Ophir has yielded nearly $5,000,000 of gold. The Council district stands second to Nome only in its aggregate output, but in 1908, owing partly to lack of water and partly through exhaustion of certain placers, it fell to the third place in annual productivity, Fairhaven taking the second place.

Council City is a thriving place of nearly 600 inhabitants, with schools, two churches, stores, etc.

The most successful lode mine in northern Alaska is in this district, the Big Hurrah, on a creek of that name. It produces a free-milling ore of paying quality, operates 20 stamps, puts out some 70 tons of ore a day, and has been developed to the depth of 200 feet with ore

still in sight. Its productivity has been temporarily stopped owing to legal complications regarding it.

The Omilak silver mine on Fish River proves the existence of paying ore with its output, which is claimed to be over $100,000 to 1908.

Port Clarence District

Port Clarence district, the largest in area, includes the northwestern peninsula. The only deep-water harbor of Seward Peninsula is at Teller, the commercial centre of the district, where the first reindeer station was established. The principal gold-producing placers are on Bering and Bluestone Creeks and Gold Run, with their tributaries.

To many this district is known through the tin mines of Cape York and Lost River. The developments of the tin lodes and placers are generally in the prospecting stage. Lost River is the only lode that has uncovered any considerable tonnage of ore. The greater part of Alaskan tin, which to 1908 scarcely exceeded $100,000 in value, has so far come from the placers of Bush Creek. While a small output of tin ore still continues and the prospects are promising as to quality and quantity, yet the decreased price of tin retards developments until higher prices or more economic methods of working obtain.

Kougarok District

The Kougarok, the great interior district east of Port Clarence, has steadily increased in importance, its initial output of $50,000 in 1900 rising steadily each

year to $200,000 in 1905, and probably $700,000 in 1907. Igloo, called locally Mary's Igloo, is the commercial centre of the district, which covers the watershed of the Kougarok and its tributaries, of which Dahl Creek is the richest. Boats from Port Clarence are able to ascend Mary River to Davidson, which point can be reached by rail from Nome as far as the Kuzitrin River.

Fairhaven District

Fairhaven district, with an area of 7,500 square miles, lies to the south of Kotzebue Sound, along which it extends from Goodhope Bay to the east about 150 miles. It is reached via Bering Strait and the Arctic Ocean during the short open season, from the middle of July to early October. Distant 150 miles from Nome, it is also attainable by long, costly travel and freight overland from the end of the railways. The output of the district to 1904 was $700,000. High freight, costly fuel, short season, and scant water have made it unprofitable to work any but the richest ground. The production has, however, steadily increased, and in 1908 amounted to about $750,000, being second only to Nome in its yield. There are three centres of production—on the Inmachuk, of which Deering is the commercial centre, and on the Kiwalik, where the Candle Creek placers and the town of Candle are well known. A third promising region has been lately developed on Goodhope River farther to the west.

In late years there have been material changes to the benefit of the district as a whole. Bench gravels are

being worked, the lignitic coal deposits have proved to be most valuable for fuel, while the introduction of water from Lake Imuruk into the placers of the Inmachuck has added materially to the output. Systematic and careful examination of the Fairhaven country is in progress, and its further successful development appears most probable. The most important project at present is the utilization of the lignitic coals of Chicago Creek, Kugruk River, with a view of furnishing cheap power for pumping water and other operations of placer mining. At present there is no such installation anywhere on Seward Peninsula.

The Goodhope precinct includes the northwest peninsula to the west of Goodhope Bay. Reached only by small boats from Shishmaref Inlet or by long overland travel from the Kougarok, its difficulty of access and high cost of supplies forbid the exploitation of any but very rich claims. Developments so far have been in the watershed of the Serpentine River.

The Koyuk precinct, to the extreme southeast, is in the prospecting stage, copper lodes on the upper Koyuk being unfavorably located for economical development under existing conditions.

Mining Ditches

Adverse conditions attendant on small rainfall, ranging from 15 to 30 inches annually in various parts of Seward Peninsula, soon made evident the necessity of ditches to obtain water for sluicing and other mining operations. To remedy matters there have been built a large number of ditches, which have

proved of great benefit, though some were injudiciously located and expensively constructed. Several millions of dollars have been invested in these enterprises, which number several score, great and small. The most expensive and extensive ditches are as follows: The Wild Goose Ditch, with pipe lines, 91 miles, delivers Pargon River water on Ophir Creek. It is the largest ditch, carries boats of size, is 10 feet wide, 3.17-foot grade per mile, has 13,000 feet fluming, and delivers 6,000 miner's inches of water. Bonanza-California, 50 miles, delivers 4,500 inches. Miocene, with branches 68 miles: it delivers 3,000 miner's inches of water, carrying it through a tunnel 1,835 feet long, and through two inverted siphons of 40-inch pipe. Fairhaven, 40 miles. Pioneer, 38 miles, 4,000 inches. Flambeau River, 29 miles, 4,000 inches. Candle, 34 miles. Cedric, 19 miles, 2,700 inches carried at an elevation of 870 feet, the highest on the peninsula.

Up to 1904 the ditches had cost nearly $2,000,000, and there were in operation 175 miles, probably 300 at present. These ditches are in active use a little over three months annually, opening on the average about June 26 and closing about October 5.

COAL FIELDS

The coal beds of Seward Peninsula, though in workable quantities in several localities, have not such quality as to displace imported coal. The local beds have been pecuniarily valuable only in the Fairhaven district, where the Kugrug lignites have become an important factor in placer mining. This coal is lignitic,

is frozen solid, checks and crumbles on exposure; however, it burns readily, leaves little ash, and has a fuel value of one-half that of Wellington coal. To the north the well-known beds near Cape Lisburne are of local importance only, while the extensive deposits of Colville River are of doubtful economic value. With Europe exploiting the coal beds of Spitzbergen there is, however, the possibility that later the deposits of extreme northern Alaska may supplement the southern Alaskan coal fields, now being developed on Controller Bay and Mantanuska River.

In the eastern part of Seward Peninsula there is a scattering growth of spruce, the largest trees not exceeding 16 inches in diameter and 50 feet in height. However, the steam saw-mill at Council has been able to meet local demands and compete with imported lumber.

Among the unexploited fuel resources of Seward Peninsula, as indeed of Alaska in general, may be mentioned peat, which is available in the tundra regions in enormous quantities. As yet either wood or coal is the more economical fuel, but, with increasing demands for fuel and a steady decrease in the supply of wood, the development of a peat industry is not improbable in northern Alaska.

OUTPUT AND SOURCE OF GOLD

Mr. A. H. Brooks estimates the value of the placer-gold production of Seward Peninsula as follows: 1898, $75,000; 1899, $2,800,000; 1900, $4,750,000; 1901, $4,130,700; 1902, $4,561,800; 1903, $4,465,600;

1904, $4,164,600; 1905, $4,800,000; 1906, $7,500,000; 1907, about $7,000,000; 1908, about $5,000,000.

On the source of the gold, Mr. F. H. Moffit says:

> It is of local origin and is a concentration from the original supply widely disseminated in small quartz veins and stringers and impregnable zones of the bed rock. This is shown by both the character and the occurrence of the gold itself. The gold in nearly every case has travelled but a relatively short distance from its original source.

Mr. A. H. Brooks says:

> The chief reason why more rich veins are not found in the region is because much of the gold was widely disseminated in small quartz stringers and in impregnable zones of the bed rock. It is not derived from a mother lode, but in the course of the destruction of the bed rock the gold thus widely disseminated in small veins was concentrated in sands and gravels.

RAILWAYS

The several railways have contributed very materially to the development of the mineral resources of the peninsula; indeed much work would have been impracticable without them. In not very recent days, not only were freight rates exceedingly high—from half a cent upward per pound for each mile across tundra country—but transportation was strictly limited and often unattainable at any price. Mr. Brooks estimated that in 1903 the cost of summer overland transportation ranged from $10 to $16 per ton per mile, and the cost of water transportation between coastal points from

70 cents to $1.50 per ton per mile, including the embarking and disembarking. These prices have been (1908) somewhat lowered, yet they are still prohibitive to mining anything but high-grade placers.

The principal railway has its initial point at Nome, where almost all foreign freight for the peninsula is landed. The railway runs north through the valley of Nome River, crosses to the headwaters of the Kruzgamepa, and ends at Lanes Landing on the Kuzitrin. From the northern terminal, Dahl Creek and the Kougarok region are easily reached by trail to the north, while Teller is attainable by boat to the west.

From Dickson (Solomon), about 50 miles east of Nome, a railway runs north through Solomon Valley and, crossing the divide, terminates at Penelope Creek, whence Council is reached by road down the valleys of the Casadegapa and Niukluk. Council itself is in direct communication with the great Ophir placers by the Wild Goose Railroad, 7 miles long.

NOME CITY

There is not much to be said of Nome City beyond the statement that it has all the modern comforts and most of the luxuries for physical well-being, with amusements and social pleasures pertaining to a wealthy, intelligent community. Springing into existence as a city of 18,000, it now numbers about 4,000 in winter and double that number of inhabitants when the arctic sun of June gives it the glory of continuous daylight. It is the commercial, judicial, and educational centre

of Nome Peninsula. In summer it is eight days from Seattle by semiweekly steamers, and in winter from thirty to forty days, through steamer, sleigh, and sledge, via Valdez, Fairbanks, and Fort Gibbon. Churches, schools, societies—all are as good as gold can command and good fellowship produce.

There are churches, libraries, banks, assay offices, clubs, electric light, theatres, hot-houses, etc. Nome is in communication by land lines, wireless, and cable with Seattle, and by long-distance telephone over a system of several hundred miles with Teller on Bering Strait, Kougarok, Council, and other towns. Railways run summer and winter, supplemented by stage, horse, or even automobile transportation to more remote points. There are excellent schools with over 200 pupils, while three newspapers are filled with local and foreign news. Life is intense in its business activities during the two or three summer months when stars are never visible. With the approach of winter several thousands go "outside," while the remaining "sourdoughs" settle down to a restful life of sociability and pleasure. The theatres, dancing clubs, ski parties, and other social amusements brighten the long arctic semidarkness for the town residents.

Winter freighting proceeds across the frozen tundra, the best time for handling much of the summer freight from Seattle, which aggregates about 100,000 tons yearly. Illustrative of the amount of business done is the fact that at Nome a lumber firm usually has about 5,000,000 feet of stock on hand, all imported from Puget Sound.

How Nome is Reached

There is frequent steamer service between Seattle and Nome, the first boat reaching Nome, in a voyage from eight to ten days, about June 15, and the last boat leaving there about October 15. The distance is about 2,741 miles. The approximate fares are $75 to $100 for first-class and $35 for steerage. Travel in and out for the rest of the year is overland by dog sled to Fort Gibbon and thence by stage to Fairbanks and Valdez, with which port there is weekly winter service by Seattle steamers. The through fare ranges between $500 and $800, according to accommodations, and the time is from thirty to forty-five days. Summer communication from Nome with the Yukon and Tanana Valley is via St. Michael, 115 miles distant, from which point boats run irregularly up the Yukon, leaving from June 20 to September 20, and arriving from June 10 to September 30.

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CHAPTER XI

THE VALLEY OF THE YUKON

The Yukon River has rendered possible the exploitation of the mineral resources of the interior of Alaska through its wondrous facilities for cheap and reliable transportation. The river and its tributaries are navigable by steamboats nearly 3,000 miles, with as much more additional water channels that are traversed by poling boats. There is not a mining camp in all the great watershed of the tributaries of the Yukon that is 100 miles distant from navigable water. The length of the navigable season of the Yukon is surprising, considering its high latitude. At Circle, near the Arctic Circle, in nine years the Yukon opened between May 11 and 22, while it does not close until early November.

The borders of the great river furnish scanty results to the gold seeker, while the few placer-paying tributaries flow from the south, the ice-clad flanks of the high Alaskan range being more prolific of gold than the lower mountains to the north.

The principal settlements in the Yukon Valley merit brief allusions. Eagle, a town of about 200, near the Canadian boundary, is the customs office for the region, and a trade centre for Fortymile and other camps. It adjoins Fort Egbert, garrisoned by two companies of Infantry.

Fort Yukon, in 67° N., 145° W., is an old trading post, around which cluster a few native settlements.

Circle, a town of a few hundred, on the Yukon, south of the Arctic Circle, is the supply centre for the Birch Creek mines.

Rampart with its population of about 400, is the trade centre for the Minook mining regions to the south. It has an agricultural experiment station, which has been very successful in its crops of vegetables and hardy cereals.

Tanana is a small town opposite the mouth of the Tanana River, and all boats in and out that stream stop at Tanana. It has also been called Weare. Adjoining Tanana is Fort Gibbon, garrisoned by two companies of Infantry and a company of the Signal Corps. About two miles distant, up the Yukon, is the St. James Episcopal Mission.

Nulato, an Indian settlement of about 300, is an old centre of trading. It is occupied also by the St. Peter Catholic Mission. There are three other missions in the lower Yukon, the Holy Cross (Jesuit), the Anvik (Episcopalian), and Ikogmut (Russian), mentioned in Chapter XXI.

In the Koyukuk Valley is Coldfoot, a mining camp 100 miles above Bettles. The latter within the Arctic Circle, being the head of navigation, is the centre of supplies for the Koyukuk mining camps.

The few productive gold placers that have been discovered in the basins of the minor tributaries of the Yukon are here briefly described.

The Fortymile precinct, in which was found the

Agriculture in the Central Yukon Valley.

(Experiment station at Fairbanks.)

first of the Yukon gold-producing placers, has an area of about 2,000 square miles and is intersected by the International Boundary, so that part lies in Alaska and part in Canada. Mining has been done under many adverse conditions, owing to the very short season—a little over four months—difficult access, and harassing customs regulations. The greater part of the district is in Alaska, but the mouth of the Fortymile River is in Canada, so that all supplies carried in by river are subject to customs regulations. Besides, the navigation of Fortymile River, by poling boats only, is hard and dangerous. The production has steadily fallen off from $307,000 in 1904 to $140,000 in 1907. The introduction of dredges and the construction of a government road from Eagle, wholly within American territory, are expected to increase the output. To the north of this district there are a few small placers in basins near Eagle, such as Seventymile and American, which produce a few thousand dollars annually.

Gold-producing placers have been developed about 100 miles up the Chandlar River, which are reached by steamer. This region is mainly in the prospective stage as yet.

A most promising region is that tributary to Circle, though its development has been slow owing to expensive methods, lack of communication, and high prices; the latter due to lack of roads, which has raised freight to 12 cents per pound, or more, per 100 miles. Despite these drawbacks the Birch Creek district produced from 1898 to 1904 an aggregate of $3,560,000. These mines have been developed entirely without out-

side capital, but lately capital has become interested so that the output will be largely increased through the modern machinery lately installed. The basins of Mammoth and Mastodon Creeks have produced nearly sixty per cent. of all the gold up to 1906. The introduction of wireless telegraphy at Circle and the construction of roads by the Alaska Road Commission are greatly facilitating business and reducing the cost of freight.

Rampart is the commercial centre of the mines in the basins of Minook, Glenn, and Baker Creeks, which have an annual production of about $300,000. The construction of roads, both Federal and private, and the introduction of modern machinery promise to largely increase the output of this region, which is steadily growing in importance.

Several creeks, Columbo, Ruby, etc., are in the prospecting stage between Fort Gibbon and the mouth of the Koyukuk.

Important gold discoveries have been made on the upper Innoko, the largest easterly tributary of the lower Yukon. The two centres of production are the Detna River and Gains Creek, which are respectively 250 and 400 miles from the mouth of the Innoko. Steamboats can run up the Innoko 200 miles to Deekakat, an Indian village about 50 miles below the Detna placers. Gains Creek is difficult of access, and the freight poled up from Deekakat is most expensive—in the early days $400 per ton from Nome.

The gold placers of the Koyukuk Valley have been mined since 1899, and have been moderately successful in their output, which averages about $125,000 annu-

ally. The richest placers are more than 600 miles from the mouth of the Koyukuk, which is navigated irregularly two or three times a year as far as Bettles, 500 miles, whence freight is taken to Coldfoot, 100 miles further, by poling boat in summer and by sled in winter. The last steamboat comes out of the Koyukuk about the end of September. The very short open season, the long winter with its extreme cold and prolonged darkness, make mining most arduous and trying in these Koyukuk camps, of which one, Nolan Creek, within the Arctic Circle, is said to be the most northerly gold placer in the world. Nevertheless, the output has been considerable, the greatest producers being Emma, Smith, Myrtle, and Nolan Creeks.

Some prospects have been made across the mountain summit to the north, on the Arctic slope, but their values are yet undetermined.

COAL

From time to time there have been expectations of the utilization of the extensive coal beds of the Yukon, of which the known area approximates 400 square miles. However, oil has tended to displace coal as supplementary fuel to the 30,000 cords of wood used annually by Yukon steamboats.

The principal coal beds of the lower Yukon are bituminous, while the upper Yukon coal is sub-bituminous. The opening of coal mines on the Canadian Yukon has been financially successful, but the stimulated efforts on the Alaska Yukon have been unprofit-

able, though attempted at several places, especially on Washington Creek and near Nulato.

The entire output from the ten or twelve mines which have been worked in the Yukon Valley, aggregates, according to Mr. A. J. Collier, about 9,000 tons, valued at $76,000.

The generally inferior quality of the coal, the difficulties of local transportation, and the high cost of labor, are cogent reasons against the successful exploitation of these coal-fields in the near future.

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CHAPTER XII

FAIRBANKS AND THE TANANA VALLEY

The Tanana River is the largest tributary of the Yukon, and its mineral resources are unsurpassed by those of any other river basin of Alaska. In addition to its gold placers and coal beds, it has extensive forests, wonderful hot springs, and land areas suited to agriculture and forage plants.

FAIRBANKS MINING DISTRICT

Of overshadowing importance in the Tanana Valley are the gold placers of Fairbanks district, which annually produce more gold than any other district in the Territory.

The discoveries and explorations of Allen in 1885 in this valley, the charting of the Tanana River by Brooks and Peters in 1898, the establishment by E. T. Barnette of a trading post on the site of Fairbanks in 1901, and the discovery of paying placers by Pedro in 1902, were the successive factors which led up to the development of this great mining district, which yields yearly about $10,000,000 of gold, a larger amount than is elsewhere mined in an Alaskan district.

The modest output from Pedro Creek in 1902 gave rise to extravagant hopes and consequent disappoint-

ments in 1903, but the influx of miners continued, though the output for 3,000 prospectors in 1904 was less than $1,200 per man. The population doubled in the succeeding year, and the yield rose from $350,000 in 1904 to the phenomenal amount of $3,750,000 in 1905. Stampedes to other camps, union strikes, droughts, forest fires, and disturbed labor conditions affected the production to some extent, but it rose to $9,174,617 in 1906, reduced by strikes to about $8,000,000 in 1907, and increased to $9,200,000 in 1908.

There are four mining precincts at considerable distances from the central district at Fairbanks—the Kantishna and Bonnefield to the southwest, the Tenderfoot to the southeast, and Hot Springs to the north.

Bonnefield and Kantishna Regions

These precincts lie southwest of Fairbanks, the Bonnefield placers being between Wood and Cantwell Rivers, while the other includes the Kantishna Basin and extends to the Mt. McKinley region. Bonnefield precinct is most difficult of access and the placers yet discovered are comparatively unprofitable at present.

The Kantishna is navigable about 175 miles, so that freight is easily landed at Diamond City on the Bearpaw, whence it is about 25 miles to Glacier City, the base of supplies for the two richest placers, Eureka and Glacier Creeks. Short seasons, high freights, and costly supplies have tended to retard materially the development of these precincts, which await more systematic examination and modern machinery.

In course of time the series of coal beds, which stretch from the upper Nenana eastward to the Delta River, will be exploited despite their low-grade quality and remoteness of situation. Extensive deposits of lignite are prominently visible in Bonnefield precinct along the northern slopes of the Alaskan range, where there is an area of 600 square miles of known coal lands. Many claims have been staked, and some coal has been mined and used locally in the Kantishna region. While transportation of coal to market in adjacent mining regions is now unprofitable, yet it is anticipated that the coal may be utilized by generating electric power locally and transmitting it to Fairbanks, about 75 miles distant.

Tenderfoot Precinct

This precinct, about 75 miles southeast of Fairbanks, near and below the mouth of the Goodpaster River, comprises the basins of Banner, Shaw, and Tenderfoot Creeks. It was unpromising financially in 1904 to 1905, when freights were $80 per ton from Fairbanks, while communication was tedious and uncertain. Its output rose to $100,000 in 1906, and with an influx of prospectors and the discovery of good ground it increased to $325,000 in 1907; its yield is claimed to approximate $500,000 in 1908.

Hot Springs Precinct

The Baker Hot Springs are remarkable for their extent and their contributory effects on crops grown thereat. Lately they are identified with mining,

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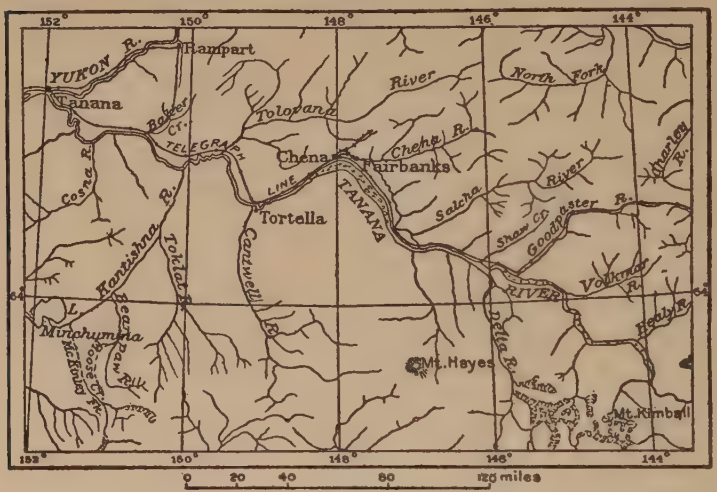
through the gold placers lately discovered in their immediate vicinity, on Baker, Sullivan, and other adjacent creeks.

FAIRBANKS DISTRICT

Far the greatest gold producer is the Fairbanks district, of which the centre is Cleary Creek, about 9



MAP NO. 3—FAIRBANKS MINING DISTRICT

miles from the city of Fairbanks. Herein is located the Pedro placer, the first paying discovery to which the district owes its prosperity. Cleary stands first with its production of $10,000,000 or more of gold, from a creek 7 miles long. It bids fair to be surpassed in the aggregate by Ester Creek, where the best modern machinery has been installed, while the productivity of Goldstream, 40 miles long, will eventually be fabulous, judging from its past output. Original Pedro

placer is yet mined, while Fairbanks, Dome, Vault, and other creeks are large producers. On each important stream has grown up a considerable camp, with populations varying from 200 to about 700.

The district is equipped with the best and most efficient mining machinery, is in telephonic communication with every mine or local business house of any importance, has its freight handled promptly and cheaply, is provided with railway transportation—winter as well as summer—to Fairbanks and adjacent mines and towns. Amply provided as it is with all the necessities and many of the luxuries of life, it seems rather to be a mining district in Montana or Nevada than in the interior of Alaska, almost on the edge of the Arctic Circle, 2,000 miles north of the Puget Sound ports.

The Town of Fairbanks

The valley of the Tanana offers favorable conditions for permanent population that are unsurpassed elsewhere in Alaska. Fairbanks' permanent population approximates 4,000 in number, which is temporarily increased to 5,000 at certain seasons. Communication with the outside is convenient and comfortable in summer, either through Nome by river and sea, or up the Yukon to Dawson and thence out via Skagway and the Inside Passage. In winter, by easy stage travel with comfortable road-houses, the town is within eight or nine days of Valdez, an open winter port in weekly steamer communication with Seattle. Either route is, however, so expensive as to keep the labor supply down

to the minimum for mining operations during the open season, May to September inclusive. Under such conditions wages are not unduly high, five to six dollars per day with board. What is known as skilled labor commands considerably higher prices, but the demand for such labor is strictly limited.

Fairbanks is a well-built town, especially within its fire limits. An electric plant furnishes light and power; the telephone service includes nearly 300 stations in the city and extends by long-distance lines to seven adjacent towns; a central steam plant heats the business quarters and many private residences; the fire system has a capacity of 15 streams at 140 pounds pressure; there is a good supply of water distributed in the business section by mains; three banks, with assay offices, and foundries cover the material side of life. Among the moral elements are five religious denominations with pastors and churches, excellent schools for about 150 pupils, two efficient hospitals open to all, three newspapers (two dailies), and a quarterly religious magazine. The papers publish the cable news of the world, which appears in creditable form through type-setting machines and cylinder presses. There are comfortable hotels, excellent restaurants, and a variety of stores from which almost everything can be obtained. A large theatre, social clubs, base-ball park in summer, curling and skating halls in winter, supplement the more quiet amusements of the many attractive homes. Adjoining Fairbanks more than 30,000 acres have been homesteaded, from which are now annually produced large crops of pota-

Fairbanks Town, Tanana Valley, on July 4, 1908.

toes and other vegetables, while hay and other forage are now grown on a large scale. The agricultural productions of the Hot Springs homestead, about 200 miles from Fairbanks in the lower valley of the Tanana, are simply astonishing in their variety, size, and quality. The lumber industry is so extensive that large capital, about 250 men, and five saw-mills are steadily engaged in handling the poplar, birch, hemlock, and spruce which in great quantities are rafted to Fairbanks from the upper Tanana and Chena Rivers.*

An important enterprise is the electric plant of Fairbanks for furnishing light and power for the adjacent mining towns, from 9 to 15 miles distant. Eventually it is probable that long-distance power will be obtained economically through plants installed at convenient points in the coal regions of the valley.

The quantities of supplies in the way of machinery, clothing, food, etc., that are imported from the outside may be judged from the fact that the two great firms, the Northern Navigation and North American Trading Companies, annually bring into the Tanana Valley about 25,000 tons of freight, while considerably more is handled by independent steamboats. The distribution of this enormous quantity of freight would be practically impossible, if there had not been provided suitable road and railway facilities to meet the rapidly developing demands. As indicated in Chapter IV, very much has been done by the Alaska Road Commission to improve the local roads, thus to reduce rates

* For distribution of forests see text map, Chapter VI.

of freight, facilitate travel by stage, and, most important, render possible a regular mail service. The work accomplished has been astonishing, and one now travels in comfort from October to May in fine modern stages, over the 373 miles of roads between Fairbanks and Valdez, the trip taking from eight to nine days. During the open season—May to early October—about three-quarters of this road can be travelled by wheeled conveyance, and probably by 1910 the whole distance will be thus passable. Over one section of this road there passed in a season 24 tons of mail, 1,540 tons of freight, and about 1,200 passengers. Around Fairbanks there have been built eight local roads, 75 miles in length, connecting every important town or camp with Fairbanks or the railway.

Important as are the roads, they are secondary in point of transportation to the Tanana Valley Railway, a system of 45 miles which has been constructed and operated by private enterprise. Commenced in 1905, it has since been operated continuously, winter and summer. Connecting the deep-water port of Chena and Fairbanks, the main line follows the placer mining region to Gilmore and Chatinika, thus reaching all the large producing placers. More than 54,000 passengers and about 15,000 tons of freight passed over the road in one season. When the railway was opened the local freight rate was $3 per ton mile, which has been steadily reduced by the railway from 88 cents per ton mile in 1906 to 58 cents in 1908. An idea of the enterprise of the railway builders, and of the cost involved, may be had from the statement that much

of the material was moved 6,000 miles, while the freight cost twice the initial value of the rails.

It is evident that the gold production of the Tanana Valley is far from having reached its maximum, and that there are opportunities for the further development of its vast coal deposits, its forest wealth, and its agricultural possibilities. Further, the writer is of the opinion that many of the settlements in this great valley will be permanent, even when its gold placers shall yield in importance to other resources.

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CHAPTER XIII

COPPER RIVER REGION AND COOK INLET

GREAT in value as are the auriferous placers and lodes of Fairbanks, Nome, and Juneau, it is believed that in time they will yield in importance and in value of output to the copper ores and coal fields of the coast region south of the Alaskan Range, extending from Yakutat westward to the Alaskan Peninsula.

The development of all this region has hitherto been slow and unsatisfactory. The gold output from 1895 to 1907 inclusive did not reach three and a half millions, an annual average yield of less than a quarter of a million, and of this amount 25 per cent. is credited to the years 1904 and 1905. It is beyond reasonable doubt, however, that the mineral productivity of this part of Alaska will be largely increased, and that within a few years.

Copper River Region

Valdez has been the centre of the activities of this district until 1908, when its new rival Cordova was founded as railway headquarters. Valdez is an enterprising town, with many advantages and attractions. Its site is beautiful and its picturesque surroundings are beyond description. The contrasting elements of bay and mountain, of glacier and valley, of moraine

and forest, must be seen to be appreciated. Within easy reach are Port Wells and Harriman fiord with a succession of live glaciers, which for their size, number, and magnificence cannot be surpassed. A few miles inland from Valdez begins a wooded country, which by the size of its trees, the color of its abundant flowers, and the variety of its edible berries recalls the most fertile valleys of California and Washington. Valdez affords all the comforts and most of the luxuries of modern life, with its clubs—notably the Tillicum—hotels, electric lights, telephone service, churches, schools, and hospital. Truck gardens thrive, and sawmills do a flourishing business. In short, there is everything to make a considerable town, except a railway into the interior, which there have been heroic efforts to build. Unfortunately, after the construction of several miles of completed track, the Alaska Home Railway Company went into the hands of a receiver. The port is the most northerly harbor in North America, possibly of the world, that is open throughout the year. In addition Valdez is the junction point of the Signal Corps Seattle-Valdez Cable and its military land lines, that reach, by a system of nearly 3,000 miles, Fairbanks, Egbert, Nome, and the Bering Strait region. More important, Valdez is the point of departure, over the Federal roads, for the great Alaskan mail that serves many thousands of miners throughout the northland. As shown in Chapter IV, these roads are the natural highway that leads to the Tanana Valley, by the only winter service in Alaska open to freight and passengers.

The mining interests of the Controller Bay region built up Katalla as a rival to Valdez, but complications arose and disadvantages developed, which ended in the practical transfer of the railway terminus to Cordova, where a thriving, bustling town came into existence in

MAP NO. 4—LOWER COPPER AND CHITINA VALLEYS

1908. Its future success is assured, though it is uncertain to what extent it will displace Valdez, about fifty miles farther to the north.

As has been stated, the gold fields of the Copper River region, though promising in their future outlook, have not been profitable producers to any extent. The output of the placers in the Nizina district, at the head

of the Chitina, and of the Chestochina Basin, could scarcely have exceeded $200,000 in 1908, though extensive improvements in the way of ditches, hydraulic appliances, and systematic development should greatly increase the future yield. Auriferous lode mining has been pursued on Jacksina Creek, where a small stamp mill has been operated and ore bodies uncovered.

The principal forms of mineral wealth in these districts consist of copper veins and coal beds, which are considered as almost inexhaustible in quantity and excelling in quality. Gold and oil are considered as yet only contributory and incidental resources.

COPPER

The copper veins from which the greatest yield is anticipated are rich in quality and extended in distribution. Indeed, it is claimed that this district is unequalled elsewhere in its copper resources, whether viewed from the standpoints of extent of field, richness of ore, or facility of mining. The deposits are both sulphides and native copper, which are widely distributed and apparently unlimited in quantity. The copper-bearing area is included between the Nebesna watershed of the Wrangell Range and Chitina Valley to the south, and from the Kotsina eastward to the International Boundary.

In both the Chitina and Kotsina basins the deposits are being systematically developed, and mining installations are under construction. No less than six companies have done extensive work for development. At the Bonanza mine, in the Nizina watershed, the mining

installation has been practically completed, pending the perfection of adequate means of transportation, which now consist of one boat connecting with the Copper River Railway.

Three disadvantages developed—the winter snow, the short summer season, both insuperable, and the inadequate, most expensive transportation both for men and material. The handling of winter freight by horse sleds is less difficult than the transportation of miners in and out. In consequence, the necessity of speedy and economical transportation was early recognized as the most important factor in, if not absolutely indispensable to, successful operations. Pending the determination of the financial expediency of developing the ore bodies, there arose numerous schemes, involving legal complications and bitter rivalries, as to route, construction, and control of such road. Several "railroad wars" occurred with violence and manslaughter, necessitating the intervention of the Federal authorities to restore the public peace. Eventually transportation facilities were provided by the Copper River Railroad, which, beginning operations in 1908, constructed a standard-gauge railway to Abercrombie Rapids, a point from which the upper Chitina is regularly reached by light-draft steamboats.

Railway construction is progressing steadily, and the completion of the Copper River Railway up the Chitina, to the mouth of the Nizina, is practically assured. This will furnish speedy and economical transportation, over a down-grade, of copper ores mined in the watershed of the Chitina. With the development

of the Bering River coal fields, thus bringing together cheap coal and cheap copper-ores, will undoubtedly spring up a large smelting industry in this district.

Prince William Sound

Copper production in this district has not waited on railroad building for its incipiency. On Prince William Sound, immediately adjoining Cordova, copper mines have been developed and operated at Ellemar, as well as farther west on Latouche Island and on Knight Island. Of these mines the Bonanza, Latouche Island, was operated continuously during 1908, and the Gladhaugh most of the time, while several other properties made small outputs. The ore shipped was high-grade, "averaging probably between 7 and 8 per cent. copper and $1 to $2 in gold and silver." Altogether Prince William Sound produced in 1908 over 500 short tons of copper, as against about 700 tons for the rest of Alaska; a striking evidence of the low unit cost of operation on the Sound, when one considers the low price of copper that year. When cheap fuel shall be available from the adjacent coal fields, large quantities of low-grade copper ore can be profitably treated by local smelters.

COAL

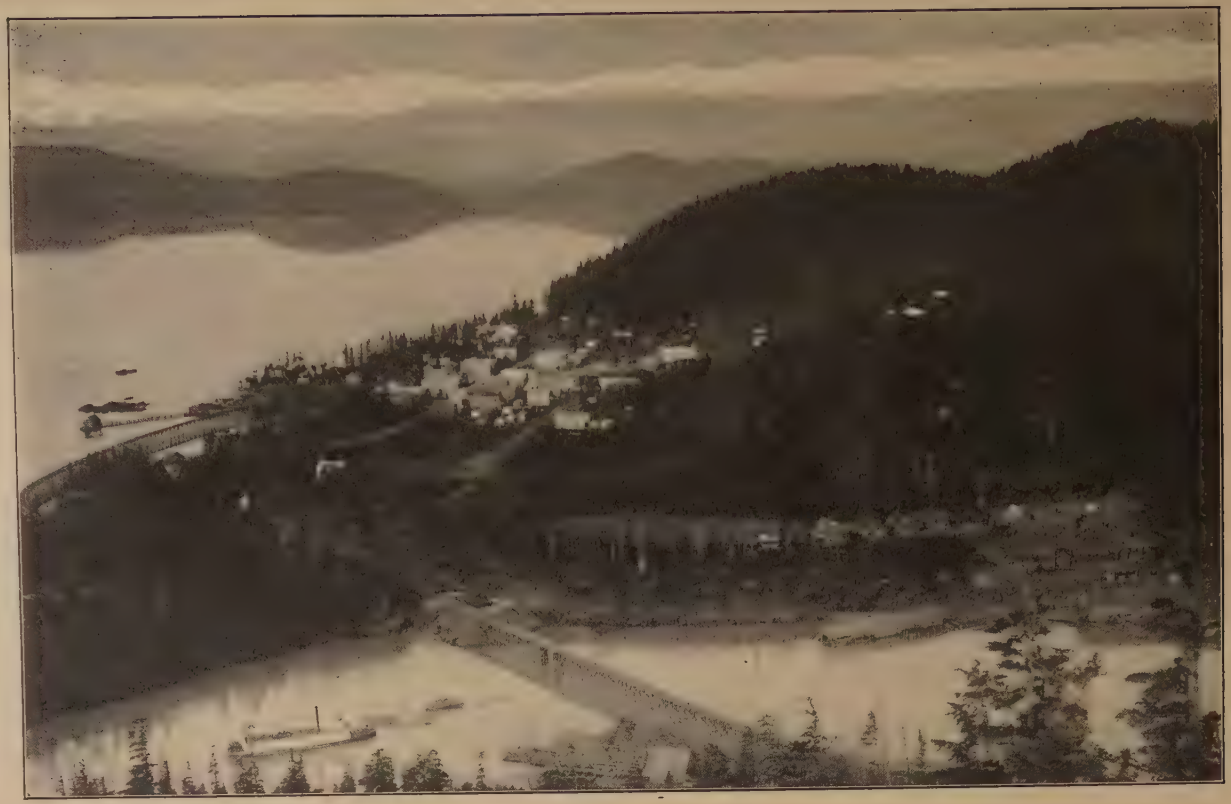
The known coal fields of Alaska, as given by Brooks, aggregate 1,238 square miles, of which 30.6 are anthracite, 54.7 semi-bituminous, 557.3 bituminous, and 861 lignite. The areas of the coal-bearing rocks aggregate 12,644 square miles.

The most important advance of late years was the systematic survey and development of the coal resources of this region.

The most valuable coal deposits in Alaska are those at and near Controller Bay, of which the Bering River veins are best known. The coal beds on the Matanuska River, Cook Inlet, are but slightly inferior. The Bering River fields cover an area aggregating 48.4 square miles, of which 26.6 are underlaid by anthracite and semi-anthracite. The opinion that these coals are suited for coke, steaming, etc., is fully justified by analyses which show that the Bering coal has a fuel ratio rising from 5.28 for the semi-bituminous to 8.77 for the semi-anthracite and 12.86 for the anthracite. The Matanuska coal values are slightly lower, ranging from 3.23 to 11.90. The best British Columbia coals range from 2.22 fuel ratio to 3.35. Comparisons with the best Eastern coals are decidedly favorable, the three standard coals being Pennsylvania anthracite, 22.33 fuel ratio; Loyalsock, semi-anthracite, 7.13; and Pocahontas, semi-bituminous, 4.46.

Of the areas of high-grade coal Brooks writes:

The Bering River field, lying about twenty-five miles from tide-water at Controller Bay, embraces 26.4 square miles underlaid by anthracite and 20.2 square miles underlaid by bituminous coal. Coal beds varying from 6 to 20 feet in thickness are exposed in this region, with some local swellings, giving a much higher maximum thickness. In quality the coals vary from an anthracite, with 84 per cent. of fixed carbon, to a semi-bituminous, with 74 per cent. of fixed carbon and include some varieties that will coke.



Cordova, Prince William Sound, and the Copper River Railroad, October, 1908.

(Chugach Mountains in the background.)

Although the Bering River coal beds have been located and partly opened, their development is practically suspended, as patents cannot be obtained for sufficient acreage to justify the expensive installations that are necessary for success. This is due to the withdrawal of these lands from entry, which however is only temporary. Meanwhile the disadvantages attendant on opening up of coal mines and marketing their output, have been in a large measure overcome by private energy and enterprise. Controller Bay did not offer proper shipping facilities, while heavy timber, dense vegetation, extended swamps, and excessive rainfall made all operations slow and costly. Conditions have now entirely changed, through the construction of the Katalla Railway, seven miles, standard gauge, which connects with the Copper River system and its terminal facilities at Cordova.

Brooks says of the importance of the coal fields:

The value of the high-grade fuels of the Pacific seaboard (of Alaska) exceeds that of the gold deposits, and the exploitation of these coal fields is of the greatest importance to the entire western seaboard of the continent. These coals will furnish not only the high-grade steam coal needed for various industries, but also the coke for metallurgical enterprises.

PETROLEUM

The petroleum fields of this region extend from the Copper River delta eastward to Bering Glacier, an area of about 150 square miles. Operations since 1901 have proceeded in a desultory way and without any

large flow of oil. A dozen or more wells have been drilled, of which about one-fourth have produced oil in moderate amounts. Difficulties as to title, heavy cost of installation, prospective competition of the Californian fields, and lack of transportation facilities are at present preventing extended operations. The local demands, however, are met by the output.

Cook Inlet

The inlet region is still in the stage of slow development rather than in that of productivity. Auriferous lode mining is gradually coming to the front, the Willow Creek Basin, of the lower Susitna, having added a five-stamp plant to the three-stamp mill that has successfully operated for several years. The gold output is as yet inconsiderable, scarcely reaching a quarter of a million in 1908, including the yields of the Sunrise, Valdez, and Yentna placers. The difficulty and expense of reaching Valdez Creek and the Yentna River preclude the successful working of any but their richest placers. None of the gold and copper lodes located on the Kenai Peninsula have yet reached the producing stage.

The Matanuska coal fields, though remote from sea transportation, are the most valuable mineral deposits of the inlet region; their area, quality, and availability are conclusively shown by late mining surveys. Two serious conditions are retarding their complete development—inability to obtain patents for the coal lands, and the financial embarrassments of the Alaskan Central Railway Company, which has suspended construction

and placed its affairs in the hands of a receiver. As Cook Inlet is closed at its head by ice for a portion of the winter, the full development of the Susitna, Yentna, Matanuska, and other mineral-producing regions depends on railways, so that their great prosperity must be somewhat delayed.

Brooks thus describes these veins:

The Matanuska coal field lies about twenty-five miles from Knik Arm, a northerly embayment of Cook Inlet (frozen in winter). The known commercially valuable coals of the Matanuska field vary in quality from a sub-bituminous to a semi-bituminous, with some anthracite. The coal beds vary from five to thirty-six feet in thickness, and the total area known to be underlaid aggregates 46.5 square miles.

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CHAPTER XIV

FUR-SEAL FISHERIES

ENWRAPPED in constant summer sea mists, which concealed them almost absolutely from chance observation, the breeding grounds of the Alaskan fur-seal were finally discovered by a patient and persistent fur-hunter, Gerassim Pribilof, in 1786, after whom the group of four islands is named. The principal islands, St. George and St. Paul, are 30 miles apart, and near by are the lesser islet of Otter and the waterless ledges of Walrus. St. Paul has an area of some 35 square miles, its highest elevation is 600 feet, and the population numbers about 300; St. George has an area of 27 square miles, its elevation is 930 feet, and the population about 100; uninhabited Otter Islet has an area of about 4 miles, while the flat-topped Walrus reef scarcely measures a tenth of a square mile.

The group is about equidistant, 200 miles, from Unalaska to the south, St. Matthew to the north, and the Alaskan mainland to the east. This isolation, the character of the frequented beaches, and the humidity of its almost sunless climate are elements that have done much to conserve these immense herds of fur-seal as a limitless source of wealth, until the introduction of the exterminating pelagic or open-sea hunting, which presents another example of reckless commercial

exploitation that is utterly regardless of the welfare of future generations.

Practically the Pribilofs have two seasons only, cool, rainy, and foggy summers from May to October, and dry, cold, and stormy winters, with very high winds, from November to April.

A few creeping willows are the only trees, but here and there shrubs furnish forth black currants and red salmon berries in good seasons. With difficulty lettuce, radishes, and turnips are raised while mushrooms grow in abundance. In addition, rank grasses, beautiful flowers, delicate mosses, and luxuriant ferns make much of the landscape beautiful during the short summer season. Of animal life there are foxes—blue and white—on the islands, but the arctic lemming is restricted to St. George.

Aside from the fur-seal, the birds of the Pribilofs are of the greatest interest. There are two great bird rookeries—on the face of the bluffs of St. George, and on the table-topped Walrus ledge.

"The latter place," says Elliott, "affords within the smallest area the greatest variety of nesting and breeding birds, for here the 'arrie,' many gulls, cormorants, sea-parrots, and auks come in countless numbers. . . . Hundreds of thousands of these birds are thus engaged [in hatching eggs], roosting stacked up together as tight as so many sardines in a box, as compactly as they can be stowed, each and all uttering an incessant, muffled, hoarse, grunting sound.

"Here, without exertion or risk, the naturalist can observe and walk among tens upon tens of thousands

of screaming waterfowl, literally ignored and surrounded by these feathered friends."

Of the eggs, Elliott relates that in 1872, six natives, in four hours, loaded a bidarka (large boat) of four tons burden to the water's edge, with the gayly colored eggs of the arrie (*lomvia arra*).

It is the otary or eared seal, commonly known as fur-seal, that is of predominating importance in these islands, this species being the most valuable of all maritime mammals in commercial productivity. The present method of rookery sealing was introduced by Pribilof in 1786, which speedily led to fierce rivalries and the settlement of the Pribilof group by 137 natives from Unalaska and Atka. The preservation of the herds from utter destruction was due to the monopoly granted the Russian Trading Company in 1799. Then the policy was adopted, which remains unchanged to-day, of restricting the killing of seals to agents of the leasing company.

In 1868 Congress made the Pribilof group a fur-seal reservation, and in the Act of June, 1870, for the preservation of fur-bearing animals, provisions were made for the leasing of the islands for a term of years. The first lease was made in 1870 for twenty years to the Alaska Commercial Company, under well-guarded restrictions to insure the preservation of the seal and to guard the welfare of the inhabitants of the islands. The company was authorized to take annually not more than 100,000 sealskins, paying therefor on a sliding scale, while certain food, fuel, and educational facilities were to be furnished the natives, whose liberty

Fur-seal Rookery on St. George Island, Pribilof.

of action and removal were likewise insured. In 1890 the lease passed to the Northern Commercial Company, whose rights expire in 1910. Under the administration of these companies the conditions of life among the natives have very materially improved, and they are unsurpassed by the Aleuts of any other islands as to education, religious training, material well-being, or other civilized conditions.

The seals resort to the Pribilof Islands for breeding purposes in the early part of June. The mother has one pup, born about the end of June, which by the early days of August has learned to swim and is ready to leave for the south. Full-grown seals of four years weigh about 200 pounds, and increase somewhat in weight after that age.

Under existing law the only seals that can be legally killed in Alaska are: first, by the Pribilof natives for food; second, by Sitkan natives in the coast waters; and third, by the authorized lessors, the Northern Commercial Company.

Under the terms of the lease only the males are killed, and from 1870 to 1890 the number was limited to 100,000 annually. These were taken between the middle of June and the first of August, when their skins are in prime condition. Since 1890 the number to be killed has been restricted to 40,000, but the largest number taken in late years was 30,654 in 1896, and since that date the catch has not reached 24,000. The number of fur-seal skins obtained since 1868, and their values, is shown for separate years in Table 5.

The high value of sealskins caused Canadian fisher-

men to attack the seals passing to and from the Pribilofs and to shoot them outside the three-mile limit, often killing both male and female; three-fourths were females. As this industry was equally important to Great Britain, where the skins are dressed and dyed, an arbitration conference was eventually held at Paris in 1893. Under the regulations there formulated, Great Britain and the United States agreed to limit pelagic sealing by prohibiting it at any time within sixty miles of the Pribilof Islands, and permitting it to be followed in the rest of Bering Sea only between May 1 and July 31 of each year. Sealers were to be licensed, and forbidden to use firearms or explosives in fur-sealing.

As pelagic sealing is still allowed, there has, however, been no practical relief by the action of the Paris conference. The destruction by pelagic and coast hunting increased from 23 per cent. of the grand total in 1889 to 58 per cent. in 1890. The disastrous effects were speedily evident, as the number of skins taken on the seal islands fell from 102,617 in 1889 to 7,390 in 1893, as against 30,812 taken that year by pelagic and coast hunters. That such action was destructive to all concerned, pelagic hunters as well as the authorized agents, is shown by the values of all sealskins taken in 1893, $584,680 as against $2,298,204 in 1888, showing that more than three-fourths of the industry had been destroyed in five years. The number of fur-seals killed on the islands averaged 14,969 for the five years ending with 1908, as against 104,245 in the five years ending with 1889.

It is estimated that the seal herd in 1867 numbered

about 5,000,000; in 1873, about 3,200,000. Pelagic, or open-sea, hunting means annihilation, as very many so killed are nursing mothers. Only a small proportion of those shot are saved, so that the whole pelagic fishery means wanton waste. As a result the seal herd at the Pribilof group scarcely exceeded 200,000 in 1905, of whom about one-third were females.

Two pelagic fleets now operate each summer, one from Canada and the other from Japan. The Canadian fleet, as a rule, strictly observes the Paris regulations; but Japan, being free from such restrictions, is bound only by the international regulations, which prohibit fishing in United States waters.

The Canadian fleet consists of about sixteen schooners, but their catch is supplemented by the hunts of coast Indians. The entire Canadian catch has gradually fallen off, being 10,832 in 1905, 9,386 in 1906, and 5,397 in 1907.

The Japanese fleet has gradually increased and now numbers about thirty-seven sail. Unfortunately the Japanese have in several cases violated law and proprieties. Doubtless many of the vessels confine their operations to open-sea captures, but they do not observe a closed season. In at least one instance their voyages partook of a piratical nature. In 1906 not only did they enter the three-mile limit of the Pribilof group, but they even attempted to plunder the rookeries on St. Paul Island in 1906. They were repelled by force, whereby seven men were killed and twelve captured, the latter escaping with three months imprisonment. Japanese sealers again invaded the United States in

1907, but only two vessels were captured in flagrant operations, though more than thirteen thousand fur-seal skins were taken by them in Alaskan waters. Unless better counsels prevail, the pernicious activity of the Japanese sealers will annihilate the Pribilof seal herds within a few years, and deprive the world of an important industry that has existed for over a century, and which, if properly conserved, would for centuries to come yield $1,000,000 or more annually.

Unless conditions are changed the seal-islands will soon become a financial burden. Even now the United States is obliged to support in part the natives whose employment is thus being destroyed, their earnings in 1908 at St. George being less for seal-catching than for foxes.

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CHAPTER XV

ALASKAN FISHERIES—THE SALMON

In general the prosperity of our Alaskan investment was long thought to be dependent on the fur-seal rookeries of the Pribilof Islands. The great falling off in marketed sealskins of one-third, from 1881 to 1882, was viewed by many as the beginning of the end of Alaskan productivity.

The maximum output in value of fur-seal skins occurred in 1880, amounting that year to $2,347,687. A few far-sighted and enterprising firms of San Francisco realized the great wealth of life in the northern seas, and were endeavoring to develop the fisheries of Alaska. Despite their utmost efforts the fishery products in 1880 were viewed somewhat askant, as they totalled less than $500,000, about one-seventeenth that of the fur-seal values.

The extension and conservation of the valuable fisheries of Alaska have been largely due to the energetic and persistent efforts of the United States Commissioner of Fisheries and his skilled assistants. Their reports are full of valuable and interesting matter, which has been largely utilized in this volume.

Few, it is thought, realize, even to-day, the extraordinary growth of the Alaskan fisheries, whose values aggregated in 1907 $9,500,000 as against less than

$500,000 for fur-seals, the rookeries producing only one-nineteenth as much as the fisheries. The general changes in these, as in other Alaskan industries, can be noted by reference to Tables Nos. 7 and 8.

Suffice it here to say that the salmon fishery alone has increased from an output of $41,277 in 1878 to the stupendous sum of $9,164,308 in 1907. Among other contributions to the grand aggregate of $10,160,183 (including $475,107 for fur-seal) of Alaskan fisheries for 1907, the next important are the cod, $148,301, and the halibut, $140,076.

The extent and importance of the fishery industries are shown not alone in their vast productivity, but also in their capitalization, personnel, and their indirect influence on trade. Eliminating the cash capital and the outfits for fishing and transportation, the total investment in 1907 reached $9,216,028. Of the 12,732 persons employed, no less than 4,829 (two-thirds white and the balance natives) were engaged directly in fishing, 7,277 in canneries, salteries, and other shore work, while 646 were employed in the transporting vessels. From the racial standpoint 5,365 were whites, 3,303 Indians, 2,206 Chinese, and 1,873 Japanese. The last-named nationality is rapidly replacing the Chinese in the canneries and salteries. It is a healthy sign that the Alaskan natives are taking up fishing in increasing numbers.

A Federal law to protect and regulate the fisheries of Alaska was enacted by Congress in 1889, but it proved ineffective and was replaced by the Act of June 30, 1906. The present law levies license taxes on business

and output; makes suitable exemptions for salmon-fry liberated; forbids obstructions against ascent of fish to spawning grounds; limits seine and other similar appliances; fixes methods and times of fishing in United States waters; authorizes preserves for spawning grounds; forbids canning or salting of fish over two days dead; makes unlawful the wanton destruction of fish; proscribes misbranding; requires sworn annual reports from corporations; and authorizes the Secretary of Commerce and Labor to formulate regulations for the enforcement of the act.

It may be added that by the law of June 14, 1906, aliens are prohibited from fishing in any of the waters of Alaska under the jurisdiction of the United States.

Salmon Industry

Apart from gold mining the salmon fishery is the overshadowing industry in Alaska. In the first five years, 1878 to 1882, the output was less than 12,000 cases, while in the five years, 1900 to 1905, the average pack exceeded 2,100,000 cases annually, valued at over $6,000,000, as appears from Table No. 7. Until the phenomenal catch of 1908 the maximum output, 2,545,298 cases (calculated on the basis of 48 pounds to a case) was in 1902, which at an estimated value of $3 a case aggregated $7,635,894. The canneries produced in 1905 1,907,967 cases, valued at $6,304,671; 1906, 2,246,989 cases, worth $7,896,392; 1907, 2,202,100, value $8,786,366. The catch of 1908 was phenomenally large, amounting (on the basis of 48 pounds to the case) to 2,606,972 cases, valued at $10,185,783; this is the

largest catch in the history of the industry, and in it were engaged 13,337 employees.

The average value per case, estimated in this account at $3 prior to and including 1904, rose from $3.30 in 1905 to $3.51 in 1906, and $3.99 in 1907.

The five species of salmon, in order of food value, are, 1, quinat; 2, red; 3, silver; 4, humpback; and 5, dog. The quinat is called king in Alaska, chinook on the Columbia, and spring on the Fraser. Its flesh is superior and it is larger than other species, averaging twenty-two pounds at maturity, and sometimes reaching 100 pounds. In Alaska the principal run is in May, and salmon appear in large numbers in the following first-class rivers: the Yukon, Stikine, Taku, Unuk, Kuskokwim, Speel, Alsek, Whiting, Copper, Susitna, Nushagak, and Kvichak. In the Yukon some king salmon ascend each year 2,250 miles to Caribou Crossing.

The red salmon, so called from its crimson color when about to spawn, is known in Fraser River as the sockeye, and on the Columbia as the blue-back. At maturity it averages about seven pounds, but its dry, reddish, most compact flesh necessitates long boiling for canning. It runs chiefly in July, and ascends the Yukon 1,800 miles to Fortymile River. It always spawns in streams which head in a lake. Small or dwarf red salmon running late in Cook Inlet are locally called "arctic salmon," and such also run in Necker and other southern bays. The four greatest of the red-salmon streams are the Fraser, Nushagak, Kvichak, and Karluk, the last, in proportion to its water, not being exceeded in the world as to its fish.

Salmon Cannery on Karluk River, Kodiak.

(The greatest salmon stream in the world.)

The silver salmon resembles the red salmon, though its flesh is paler and better flavored. Called coho in Puget Sound, it is canned under that name, or as "medium red." It runs in Alaska from August 15 to September 15, though it can be taken by seine throughout the year on all fishing grounds.

The humpback is the most abundant species in Alaska.

Prof. D. S. Jordan, an authority on fishes, says:

> It exists in millions, it swarms everywhere in waters near the sea—breeding wherever a little fresh water can be found. In the large rivers the humpback rarely runs, and it is therefore almost unknown in the Sacramento, the Columbia, and even the Fraser.

The plump, silvery dog salmon, known also as calico salmon, averages ten pounds. Its flesh is pale and is unsuitable food when canned. It is, however, well flavored when fresh and is exported by cold storage as well as salted.

In quantity the king or spring salmon forms a most inconsiderable factor, the catch being less than one per cent. of that canned.

A comparatively small number of coho or silver salmon is caught, about 3 per cent. in 1906 and also in 1907, while the dog or chum salmon fell off from 10 per cent. in 1906 to 5 per cent. in 1907.

The great bulk of the salmon fishery consists of the red or sockeye, which formed 62 per cent. of the whole catch in 1906 and 56 per cent. in 1907. Fifty-six per cent. of the sockeye in 1906 were caught in western Alaska, *i. e.*, north of the Alaskan Peninsula; the central

region, from Yakutat Bay westward to Alaska Peninsula, furnished 31 per cent. In 1907 there was a small relative increase in the central district and a diminution in the western waters. The pack of red salmon was the smallest for several years in 1907, but whether this is accidental or is an indication of overcatch is uncertain. Doubtless it will either stimulate packers or the United States to proper restrictions in catch, and to supplemental means of the artificial reproduction of this most valuable species. Among such remedial measures, it is the recommendation of the Commissioner of Fisheries to forbid the salting of salmon bellies by processes that waste the rest of the fish. Beneficial effects are also anticipated from the law of June 28, 1906, for the protection and regulation of the Alaskan fisheries.

The humpback or pink salmon is caught almost entirely in southeastern Alaska, throughout the waters of the Inside Passage. While it formed only 24 per cent. of the entire catch in 1906, it had increased in 1907 to 36 per cent.

Salmon are caught in Alaska by seine, gill-net, and trap, in the order named; the percentages in 1907 being 44, 32, and 24 per cent. respectively. As compared with the preceding year there was a falling off of 9 per cent. in the catch by gill-nets and a gain of 6 per cent. by traps.

That there is ample ground for economical improvement in the salmon industry is evident. There is an enormous waste in the offal, of which it is estimated that 35,000,000 pounds were thrown overboard in a

single season. The great loss may be estimated from the fact that each ton of salmon offal will produce some 400 pounds of fertilizer and about 20 gallons of oil.

The prohibition of the use of stationary fishing gear on the Nushagak River, and the closing of Wood River to commercial fishing, by the Secretary of Commerce and Labor on January 1, 1908, are important steps toward securing ready access for salmon to their spawning grounds.

Canneries and Salteries

In 1907 there were operated in Alaska 45 canneries and 39 salteries, of which there were in southeastern Alaska 22 canneries and 32 salteries; in the central region 7 and 4, and in the western district 16 and 3 respectively. In 1908 there were operated 50 canneries and 35 salteries. The most important canneries as to their catch were at Boca de Quadra, Alsek River, Dundas, Kasaan, and Yakutat Bays in southeastern Alaska; at Kasilof, Uyak, Alitak, and Karluk in central Alaska; and on Ugaguk, Naknek, and Kvichak Rivers, and on Nelson Lagoon.

The salting of salmon, begun in 1868, has become an important industry. It increased slowly and irregularly to 1887, when it amounted to less than $40,000. It reached the extraordinary value of $272,648 in 1900, an output which overstocked the market and seriously affected the trade. In 1908 there were 35 salmon salteries which put up 35,949 barrels and 6,247 half barrels.

The preserving methods have since been radically changed, and in 1907 the dry-salted salmon was valued only at $1,505. Pickling, mild-curing, smoking, freezing, and cold storage of salmon now supplement canning. The total output under these curing methods aggregated $262,337 in 1906 and $384,967 in 1907, the marketed fresh salmon amounting to $29,397 in 1907.

The value of all salmon caught in 1908 was $10,671,651, of which $485,868 pertains to other than canned salmon, *i. e.*, to salted, mild-cured, fresh, etc.

Hatcheries

Previsionary and timely measures have been adopted to insure continued prosperity in the salmon fishery, by guarding against undue depletion through the enormous number of fish canned yearly. The initiation and operation of salmon hatcheries were due to the private foresight and business enterprise of Alaskan packers.

In 1906–1907 four salmon hatcheries were operated, the Karluk River and Fortmann (Naha Stream) by the Alaska Packers Association; the Klawak Lake by the North Pacific Trading and Packing Company; and the Yes Lake Hatchery by the United States Bureau of Fisheries. They took, respectively, the following millions of salmon eggs: Karluk, 39; Fortmann, 105; Yes Lake, 58; and Klawak, 4.

The establishment of the Karluk cannery in 1891, which released 500,000 fry in 1892, has grown into a great well-ordered system, which released 174,000,000 of fry in 1906. The output in millions has been as follows: 1894, 2; 1895, 5; 1896, 5; 1897, 7; 1898, 10; 1899,

11; 1900, 13; 1901, 16; 1902, 54; 1903, 63; 1904, 47; 1905, 104; 1906, 105; 1907, 174; and in 1908, over 200 millions.

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CHAPTER XVI

ALASKAN FISHERIES—THE COD, ETC.

The cession of Alaska to the United States immediately stimulated and rendered permanent the hitherto desultory and experimental fishery efforts, and the fleet engaged in catching cod immediately increased from three sail in 1867 to fourteen in 1868, all from the port of San Francisco.

The great distance from the home port at which the fishery was conducted proved so expensive in time and money that the policy was adopted of establishing in Alaska shore stations, from which fishermen could operate in small boats. The first shore station was located in 1876 at Pirate Cove, in the Shumagin group. In 1907 there were no fewer than nineteen such stations, situated on the following islands: Six on Unga, four on Sanak, three each on Guinak and Sagai, two on Little Koniuji, and one on Popof. These stations are operative the entire year. The fishermen usually go out singly, in a dory, from one to five miles, where in good weather they haul trawl lines several times each day. The men thus employed furnish only the fishing gear.

In fleet operations the fishing is usually by hand lines from dories; while each vessel carries a dressing gang, with splitter and salter. The usual bait, both shore and ship, is halibut, sculpin, and cuttle-fish.

As better grounds—the outer banks—have been discovered, the fish prove larger, and the average weight of a codfish has risen from 2.8 pounds in 1868 to 4 pounds in 1905.

Systematic work was commenced by the Bureau of Fisheries in 1888 to locate and survey the best fishing grounds, and the *Albatross* in the next four seasons examined and plotted many codfish banks, of which the following are the principal: Slime, Baird or Moller, and Gravel, all in Bering Sea; Davidson, Albatross, Portlock, Sannak, and Shumagin, on the southern side of the Alaskan Peninsula.

The value of the cod catch, from year to year, appears in Table 6, but the fluctuation in the market price of Alaskan cod has varied so greatly that the tables of values and quantities materially differ. The salted weight of codfish fell from 842 short tons in 1868 to 228 in 1874. Rising to 1,322 tons in 1885, it has annually exceeded 1,000 tons since, except in 1899. It rose above 1,500 tons for four years and its increase has been steady, though irregular. Of late years the salted product has been, in short tons, as follows: 1900, 3,034; 1901, 3,008; 1902, 4,500; 1903, 4,354; 1904, 5,532; 1905, 6,062. An overstocked market and bad season combined to cause a great falling off to 2,130 tons in 1906, 3,029 in 1907, and to 1,900 tons, valued at $134,775, in 1908.

Special care is necessary properly to cure the Alaskan cod to a condition equal to that of the Atlantic cod, and neglect in the past has militated against the regular marketing of the Alaskan cod in the great fish-consum-

ing West Indies. The establishment of fixed standards and their rigid maintenance will serve to increase the use of the Alaskan cod, of which the catch can, it is believed, be enormously increased.

To benefit further and render permanent the valuable cod fisheries of Alaska, the Commissioner of Fisheries of the United States has recommended that a national hatchery be established on one of the Shumagin Islands.

Halibut Fishery

Although limited in its output, as compared in early years with the cod fishery and most especially as to the salmon catch, yet the halibut is an important and steadily increasing factor in the productivity of Alaskan waters. The importance of the halibut catch is indicated by the statistics for 1907, which show that the invested capital amounts to $16,917, with a personnel of 591. The halibut products in Alaskan waters for that year amounted to $238,751, including the take of the Puget Sound fleet there fishing. In 1908, exclusive of the Puget Sound fleet, it was valued at $175,742.

At shore stations the men are paid per fish, while the fleet fishery is conducted on shares. Eighty per cent. of the halibut are packed in ice, from near-by glaciers, and so marketed fresh in the Puget Sound ports through passing commercial steamers, on which freight rates from Juneau to Seattle range from $7.50 to $9 per ton. About ten per cent. of the halibut is marketed frozen, for which purpose cold-storage plants have been built at Tee and Taku Harbors. The remainder of the catch is fletched and mostly salted, though some is

smoked at Juneau. The experimental canning of the halibut has been successful, and its extensive prosecution in the future seems assured.

Occasionally halibut weighing from 200 to 250 pounds are taken, and one weighing 365 pounds was brought into Juneau in 1904. One of the catch in 1907 had twenty-two good-sized herring in its stomach. It is stated that females have well-developed eggs at all seasons of the year. The halibut frequent the banks of the Inside Passage only in the cold months, from October to March, seeking deeper water on the approach of warm weather.

The detailed catches prior to 1905 are unavailable, but from 1890 to 1904 inclusive they aggregate, according to Mr. J. N. Cobb, 12,454 short tons of the value of $772,658. The catch and value in late years are: 1905, 2,360 tons, $148,904; 1906, 2,100 tons, $158,318; 1907, 1,795 tons, $140,751; and 1908, 2,768 tons, $175,742. To these values should also be added the catch of the Puget Sound fleet in Alaskan waters, $80,881 in 1906, and $98,025 in 1907, and probably $100,000 in 1908.

Halibut fishing is conducted both from shore stations and by fleets, power and sail. Steam trawlers have proved uneconomical, although trawls are largely and successfully used by fishermen in dories.

Eighty per cent. of the catch is from shore stations, which are established on the shores of, or adjacent to, the Inside Passage between Ketchikan and Juneau, in Frederick Sound, Icy, Chatham, Peril, and Summer Straits, with headquarters at Wrangell Narrows.

Thus far the halibut fishery has been confined to southeastern Alaska, where its output is thought to have reached its maximum, and the extension of the halibut industry is considered probable in the near future to Cook Inlet and adjacent large banks, and to Bering Sea.

Herring Fisheries

The herring catch has been confined to southeastern Alaska, where it has been of considerable importance for many years, though in late seasons there have been steadily decreasing outputs, as appears from inspection of Table 7.

From 1901 to 1905 the herring products averaged in value, including oil and fertilizers, more than $100,000 annually, with a maximum of $124,950 in 1901. Since 1883 the entire value must approximate $2,000,000, as incomplete data exceed in amount $1,750,000.

The decreased catch in late years is attributed to the persistent over-fishing by nets for the purpose of making fertilizers, thus breaking up schools and driving the herring into deeper water. Out of the 1907 values of $54,239, 44 per cent. of the herring were used for food, 31 for bait, and 25 for fertilizers. Smoked and canned herring are being experimentally marketed, and the larger use of this excellent fish for food is anticipated. The total value of herring taken in 1908 was $69,250—food, oil, and guano.

Cobb, in his report to the United States Commissioner of Fisheries, says: "There is no question but that the

herring fisheries of Alaska will be quite important in the near future."

Fertilizers and Oil

The principal fertilizer plant was erected at Killisnoo, of which, in their report of 1906, Cobb and Kutchin write:

> This plant, originally built to handle herring, since 1882 has produced 4,281,420 gallons of oil, valued at $1,055,369, and 29,319,800 pounds of fertilizer, valued at $349,349. In the early years . . . the vast majority of fish taken were herring, but of late years . . . large quantities of salmon have been utilized.
>
> The establishment gives employment to 600 persons, half of them Indians, being largely dependent upon the work and wages. It would seem unfair to forbid the plant to use herring unless a substitute can be found.

They suggest as this substitute salmon and other fish offal.

The Killisnoo establishment handled in 1907, 33,700 barrels of herring and salmon against 61,500 barrels in 1906, with a decreased value of $19,126.

It is evident that in the near future the wise previsionary policy of conservation of resources will be applied to Alaskan fisheries, where the utilization of products now wasted would enormously augment the output of future years.

Trout

Of the four species of trout in Alaska, the Dolly Varden, often called salmon trout, is very abundant, and reaches a weight of ten pounds. It is found in every stream, except in the upper Yukon region; is a

fine game fish; and affords excellent food, but is only of local value at towns where it may be eaten fresh. The Mackinaw trout abounds in the lakes of the upper Yukon region; frequently reaches a weight of fifty pounds; and is often seen in the markets of Dawson and White Horse. Steelhead trout, weighing from ten to fifteen pounds, are taken in river mouths, and are either salted or marketed by cold storage. The rainbow trout is occasionally found, while the cut-throat trout, averaging about three pounds, is abundant at Sitka and in streams farther south.

Miscellaneous and Minor Fisheries

Capelin are abundant in coastal waters; in Sitka Bay great schools appear in October.

Eulachon, or candle fish, frequent in large numbers the river mouths and bays of southeastern Alaska for brief periods in May. Large schools frequent the rivers of Cook Inlet for a brief stay. On Alaskan Peninsula, at Three Star Point, they strand on the beach in such numbers "that the bears are attracted for miles around to feed on them." The natives insert a wick or pith through the dried fish, which is so oily that when lighted it burns with the clearness and regularity of a candle, hence its name.

Smelt run annually in the mouths of most rivers. In 1906 a shipment of 500 pounds to New York City elicited a telegraphic order for a carload.

Tomcod very abundant in fall and spring in Norton Sound, furnishing largely the food supply for natives—dogs as well as men.

Atka Mackerel, so called, very plentiful along the Aleutian Isles, where they largely form the native food supply.

Lamprey abound in the Yukon in great numbers. They are captured by the natives through the ice and frozen for winter dog food.

Dallia pectoralis, a small, very fat black fish, forms as a whole the principal winter food of the natives of the Yukon and Kuskokwim deltas. Its tried-out pellucid oil is considered a greatly relished delicacy. The method of obtaining oil is described by Petroff in his "Report on Alaska," p. 61.

Whitefish are most abundant in the rivers flowing into the Bering Sea. Caught in ingenious wicker-work traps by the Indians, they form an important part of the winter food.

Boreogadus saida is an important food for the natives at Point Barrow, while to the east the tributaries of the Arctic Sea furnish whitefish and the Mackenzie inconnu, which sometimes reaches a length of five feet and a weight of fifty pounds.

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CHAPTER XVII

TOURIST TRIPS

THERE are three Alaskan trips that can be especially recommended to tourists from the stand-points of time, expense, and attractiveness. The Inside Passage from Seattle to Skagway is the best known, the shortest, and most largely followed. The Prince William Sound and the Yukon-Nome trips, though longer, are more thoroughly comprehensive and desirable. The attractions of these routes are here set forth: for fares see Chapter XXVII.

To intending tourists Gannett humorously says:

> If you are old, go by all means; but if you are young, wait. The scenery of Alaska is much grander than anything else of the kind in the world, and it is not well to dull one's capacity by seeing the finest first.

INSIDE PASSAGE.

The Inside Passage is the local name applied to the coast and sheltered water ways connecting Seattle and Skagway. Emerging from Puget Sound the steamer skirts the east shore of Vancouver Island, crosses Queen Charlotte Sound, again seeks the quiet inside waters as far as Dixon Entrance, whence it passes into the inland channels of Alexander Archipelago. Save in two stretches of forty and twenty

miles, respectively, there is no opportunity for an ocean swell. This extraordinary comfort of navigation is enhanced for voyagers by a continuity of fascinating landscapes, of the most varied and novel character. John Burroughs tersely describes it as a thousand miles "through probably the finest scenery of the kind in the world that can be seen from the deck of a ship—the scenery of fiords and mountain-locked bays and arms of the sea."

Nine fortunate voyages in regular steamers, which are scarcely less comfortable than the excursion boats, have made the writer familiar with external aspects and local topography, without, however, giving him power adequately to describe or correctly to classify its moods and brilliancy, its majesty and beauty. Suffice it to say, that during each of these four-day voyages his attention was steadily engrossed in the varied and magnificent landscapes which are best likened to a moving panorama of nature's masterpieces.

Though occasionally touching at Vancouver, the regular steamer ordinarily makes but one stop, Port Townsend, in the 720 miles from Seattle to Ketchikan. Thence to Skagway, Wrangell is the ordinary, Juneau and Treadwell the regular, port of call. The excursion steamers, which carry no local passengers, make the round trip in eleven days, stopping also at Metlakatla, Taku Glacier, Sitka, and occasionally at other points of interest, as may be scheduled.

To me the landscape has never been twice alike, with its shifting lights, changing seasons, and varying weather, affording the same pleasure for study and

observation as a beautiful woman in her capricious moods. Along the Alaskan coast the elements of sea and mountain, of glacier and forest, of crag and vegetation, take on such subtle qualities of beauty and tenderness, of grandeur and picturesqueness as to bewilder the traveller when he pauses to analyze and compare.

Yesterday, the Gulf of Georgia entranced with its displays of form and color. To-day, the rocky shores, the jagged reefs, and swirling currents of Seymour Narrows appall. To-night, the Greville Reach seems most fascinating of all. To-morrow, the beauties of Naha Bay will seem to excel. Then with crescendo emotions one absorbs the perfection of Wrangell Narrows, the unsurpassable views of Frederick Sound, only to find later some aspect of nobler character at Taku Glacier or in Lynn Canal. Description is beyond the powers of the writer, who asks attention to a few words from gifted lovers of nature.

Mrs. Higginson, in her interesting "Alaska," writes:

Of the fiords tributary to Millbank Sound, innumerable cataracts fall sheer and foaming down their great precipices; the narrow cañons are filled with their liquid, musical thunder, and the prevailing color, the palest green, reflected from the water underneath the beaded foam.

These fiords are walled to a great height, and are of magnificent beauty. Some are so narrow and so deep that the sunlight penetrates only for a few hours each day—eternal mist and twilight fill the spaces. Covered with constant moisture, the vegetation is of almost tropical luxuriance.

John Burroughs, in the "Harriman Alaska Expedition," says:

A scene such as artists try in vain to paint and travellers to describe; towering snow-clad peaks far ahead of us, rising behind dark blue and purple ranges, fold on fold and all aflame with the setting sun. The solid earth became spiritual and transcendent.

Miss Scidmore, one of nature's keen observers, says:

Of all the lovely spots in Alaska commend me to the little land-locked Naha Bay, where the clear, green waters are stirred with the leaping of thousands of salmon, and the shores are clothed with an enchanted forest of giant pines, and the undergrowth is a tangle of ferns and salmon-berry bushes. Of all green and verdant woods I know of none that so satisfy one with their rank luxuriance, their beauty, and picturesqueness.

Again Mrs. Higginson describes a notable reach:

In Finlayson Channel the forestation is a solid mountain of green on each side, growing down to the water. The reflections are so brilliant and true on clear days, that the dividing line is not perceptible to the vision. The mountains rise sheer from the water to a great height, with snow upon their crests and occasional cataracts foaming musically down their fissures. We are so close to the wooded shores that one is tormented with the desire to reach out one's hand and strip the cool green cedar needles from the drooping branches.

For an account of Taku Glacier, see Chapter XVIII.

In the narrow pass beyond Clarence Strait [says Miss Scidmore] the waters reflected in shimmering,

pale blue and pearly lights the wonderful panorama of mountains. The first ranges above the water shaded from the deep green and russet of the nearer pine forests to azure and purple, where their further summits were outlined against the sky or the snow-covered peaks that were mirrored so faithfully in the long stretches of the channel.

Miss Scidmore was as much charmed with Wrangell Narrows as was the writer, for she says:

It was an enchanting trip up that narrow channel of deep water, rippling between bold island shores and parallel mountain walls. Beside the clear, emerald tide, reflecting every tree and rock, there was the beauty of foaming cataracts leaping down the sides of snow-capped mountains, and the grandeur of great glaciers pushing down through sharp ravines and dropping miniature icebergs in the sea. Touched by the last light of the sun Patterson Glacier was a frozen lake of wonderland, shimmering with silvery lights, and showing a pale ethereal green and deep pure blue in all the rifts and crevices of its icy front.

Through Wrangell Narrows one emerges from scenes of quiet beauty into a domain of impressive grandeur. The attention of most tourists is here drawn entirely to glacial wonders (see Chapter XVIII), to the exclusion of the more general features of this region, which present in unique harmony high peaks, deep fiords, great mountain masses, extended sweeps of ocean, and vast ice-caps. Burroughs simply says: "We sailed under cloudless skies along Frederick Sound, feasting our eyes upon the vast panorama of encircling mountains." These interwoven elements of

mountain and sea, of fiord and glacier continue until one passes the serrated cliffs of Lynn Canal and reaches Skagway, the end of the Inside Passage.

The present commercial importance of Skagway, the terminus of the Inside Passage, depends almost entirely on the operations of the White Pass and Yukon Railway, which has there established its headquarters, repair shops, etc. The town has a population of about 1,200, is provided with cable, telephonic, and telegraphic service, is electrically lighted, has good schools, churches, well-stocked stores, attractive homes, and good gardens. Picturesquely situated in an amphitheatre surrounded by high and usually snow-capped mountains, Skagway is the best-known town in Alaska. It will live in history as the base of operations for thousands of adventurous prospectors during the Klondike excitement of 1897–1898. Skagway is a pleasant base for excursions for the lover of the picturesque, the admirer of scenery, the student of natural history or ethnographical subjects. Reasonably near are the Chilkat and Chilkoot villages, with their native hats, baskets, and blankets. Over the White Pass, by rail, through scenery of beauty and grandeur, and along the way once marked by scenes of human misery and courage, one reaches in a few hours the lake sources of the Yukon. Near by also are the glaciers of Davidson, Mendenhall, and others, which will richly repay a visit. Along the foaming rapids of Skagway River, with its flowery banks, or up the winding paths to the mountain forests, the flowery glades, and sylvan lakes, there is surprise

upon surprise at the delights and beauties that hourly break in on one, while wandering in the delicious summer weather of the Alaskan wonderland.

PRINCE WILLIAM SOUND

The Inside Passage is wonderfully attractive, but it yields in grandeur of beauty to the Prince William Sound route, which should always be taken, via Juneau, unless want of time absolutely forbids. One thus sees the best of the Inside Passage, from Seymour Narrows to Juneau, branching westward from the last-named town to Sitka, and thence along the incomparable Fairweather Range to the crowning mountain glory, St. Elias, and westward, from Yakutat Bay to Valdez, the wonderful Columbia Glacier and its sisters of Harriman Fiord. Thence to Resurrection Bay, the Kenai Peninsula, and Cook Inlet, is the end of this voyage, which can be extended to the westward by another steamer. (See Chapter XXII.)

With comfort and clearness one views from Cross Sound to Cook Inlet a series of lofty mountains, extensive snow-fields, great glaciers (the Malaspina skirts the sea for nearly seventy miles), and forest-lined cliffs, such scenery as cannot be elsewhere matched in the world in the same area and distance. (For mountains and glaciers, see Chapters XVIII, XIX.)

The writer's experiences were akin to those of John Muir, who says:

The sail down the coast from St. Elias along the magnificent Fairweather Range, when every mountain

St. Elias Alps, and Disenchantment Bay.

stood transfigured in divine light, was the crowning grace and glory, and must be immortal in the remembrance of every soul of us.

Of Yakutat Bay, Mrs. Higginson says:

To the very head of Russell Fiord supreme splendor of scenery is encountered, surpassing the most vaunted of the Old World. Within a few miles, one passes from luxuriant forestation to lovely lakes, lacy cascades, bits of green valley; and then of a sudden, all unprepared, into the most sublime snow-mountain fastnesses imaginable, surrounded by glaciers and many of the most majestic mountain peaks of the world.

Of Prince William Sound, to the west, John Burroughs writes:

Our route was a devious one: past islands and headlands, then over the immense expanse of the open water, with a circle of towering snow-capped mountains far off along the horizon; then winding through arms and straits, close to tree-tufted islands and steep spruce-clad mountains; now looking between near-by dark-forested hills upon a group of distant peaks white as midwinter; then upon broad, low-wooded shores, with glimpses of open meadowlike glades among the trees.

The striking features of the Sound region are set forth in the chapter on glaciers (XVIII), the wondrous splendor being that of Harriman Fiord. This fiord indents the northeast shore of Kenai Peninsula, a land of 9,000 square miles in area that is a sealed book to the ordinary tourist. To the Cook Inlet visitor, however, its thousand miles of bold coast present magnificent scenery—high mountains, rugged summits, deep-cut

valleys, and numerous glaciers. Invaded for fur, for fish, for coal, and now for gold, its chief charm lies in its mountain fastnesses, with their abundant game and opportunity of adventure.

Writing of the scenery of the interior of Kenai, Colonel Caine, the English sportsman, says:

The view was sublime. To our right the enormous glacier, from which this branch of Indian River issues, filled up the whole of the head of the deep valley, the precipitous sides of which fell almost perpendicularly to its foot in cliffs a thousand feet high, till it met the skyline ten miles away. Beyond the gorge mountain after mountain stretched away as far as eye could reach, with a glimpse between two peaks of another glacier.

The extension of the Copper River Railway also bring within tourist reach the glaciers of the lower Copper, and the fascinating wilderness of volcanic Wrangell and the adjacent mountains.

THE YUKON JOURNEY

The journey of fullest interest is the trip from Seattle to Skagway, Dawson, Fairbanks, Nome, and back to Seattle by sea. One thus sees the Inside Passage, the Canadian Klondike, the great valley of the Yukon, the Fairbanks mines, the Nome goldfields, views of McKinley, and, if fortunate, a glimpse of the volcanic peaks of Unimak. The only drawback is the time, from thirty to forty days, for the journey is made with comfort, safety, and at moderate expense.

The lakes of the source of the Lewes, the great gorges and rapids of the upper Yukon, the elaborate mining plants of the Klondike, the midnight sun of Fort Yukon, the grand views of the Alaskan and McKinley Ranges, the Indians' village of Nulato, and others, the mission of Holy Cross, the Esquimaux of the Yukon Delta, the darkless and genial days as one glides down the Great River, the glimpses of Nome and its environs, are unique scenes which impress even the least sensitive, and remain long in the memory.

Nor is the scenery of the delta country entirely devoid of beauty—to the writer being most impressive. Mr. A. H. Brooks, in his valuable "Geography and Geology of Alaska," thus describes it:

> The mighty river, with its dark yellow waters, is not without its grandeur, and the rounded valley slopes, dotted with spruce and deciduous trees, are not without picturesqueness. . . . Inland, the moss and grass covered lowlands stretch almost unbroken to the horizon, except for distant, rounded highland masses, while seaward there is no break in the lowland and its smooth surface merges with the plains of the sea.

Nowhere else does there seem to be the same immensity of space and sense of quietude, which bring one near to God and to the heart of the universe.

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CHAPTER XVIII

GLACIER REGIONS

Of all the attractions of Alaska the névé fields, with the various forms and awe-inspiring action of living glaciers, most impress and interest the tourist. This, despite the fact that the most extensive and striking glaciers are not seen by the summer visitors, who very rarely extend their excursions to the surpassingly wonderful regions of Yakutat Bay and Prince William Sound. From year to year, however, the number of visiting students and sightseers must steadily increase along the shores of the Gulf of Alaska, where glaciers far surpassing those of Europe are accessible with the utmost comfort, at moderate expense, and by sea voyages of three or four days.

The high and sharply uprising mountains of British Columbia and southeastern Alaska are the recipients of heavy snowfalls from the moisture-laden ocean winds, and, in consequence, the loftier peaks and valleys are ice-laden with small glaciers. These are of various types, the Alpine, the valley, or the overhanging Piedmont ice sheets covering and projecting from shelves on the mountain sides.

As one passes Wrangell the glacier formations increase in extent, and pushing down the mountains many approach the level of the sea. The numerous and deeply penetrating fiords usually terminate in

gorges, which are filled with rivers of moving ice. They are mostly dead glaciers, retreating and vanishing from year to year, under changing conditions which cut them off from their functions as live glaciers, of discharging ice masses into the open sea.

In Le Conte Bay, near the mouth of the Stikine River, is the most southerly of the live glaciers, debouching from a narrow fiord whose rocky walls rise from 4,000 to 5,000 feet within a few miles.

Some distance farther to the north, in Stephens Passage, are two beautiful ice fiords, Holkham or Sumdum and Taku.

Of the Sumdum Bay, which he considers one of the most interesting of all the Alaskan fiords, Muir says:

A hundred or more glaciers of the second and third class may be seen along the walls, and about as many snowy cataracts, which, with the plunging bergs, keep all the fiord in a roar. The scenery in both the long arms of the bay and their side branches is of the wildest description, especially in their upper reaches, where the granite walls, streaked with waterfalls, rise in sheer massive precipices, like those of Yosemite Valley, to a height of 3,000 and even over 4,000 feet.

Of her early visit to Taku, Miss Scidmore writes:

That day on the Taku Glacier will live forever as one of the rarest and most perfect enjoyment. The grandest objects in nature were before us, the primeval forces that mould the face of the earth were at work, and it was all so out of the everyday world that we might have been walking a new planet, fresh fallen from the Creator's hand.

Of Taku Inlet, with its forty-five ice streams,

great and small, John Muir writes of the discharging glacier:

It comes sweeping forward in majestic curves and pours its countless roaring, plunging masses into a western branch of the inlet, next the Taku River. Thus we have here in one view, flowing into the sea, side by side, a river of ice and a river of water, both abounding in cascades and rapids, yet infinitely different in their rate of motion and in the songs they sing—a rare object lesson, worth coming far to learn.

The true glacier region begins to the west of Lynn Canal, along the shores of which, however, are most beautiful dead glaciers, such as Davidson and Mendenhall, and from Cross Bay north. The extreme southern limit has been known to many tourists through the excursions in former years, before the convulsions of nature largely disintegrated many of the glaciers, especially the Muir Glacier.

Kate Field thus described this great ice-stream:

Imagine a glacier three miles wide and three hundred feet high, and you have a slight idea of Muir Glacier. Picture a background of mountains fifteen thousand feet high, all snow-clad, and then imagine a gorgeous sun lighting up the ice crystals with rainbow coloring. The face of the glacier takes on the hue of aquamarine—the hue of every bit of floating ice that surround the steamer. This dazzling serpent moves sixty-four feet a day, tumbling headlong into the sea, startling the ear with submarine thunder.

Doubtless the most remarkable for its extent, equal in area to the State of Rhode Island, and of unsurpassed beauty in itself and its surroundings, this great glacier

and its companions are now rarely visited, owing to the dangers of navigation within Glacier Bay. Of the Muir Glacier Miss Scidmore writes of her last view:

> The whole brow was transfigured with the fires of sunset; the blue and silvery pinnacles, the white and shining front floating dreamlike on a roseate and amber sea, and the range and circle of dull violet mountains lifting their glowing summits into a sky flecked with crimson and gold.

From Glacier Bay north to the Wrangell Range, and westward to Kenai Peninsula, about 500 by 100 miles in extent, is the area of greatest glacial abundance, fully nine-tenths of the ice of this continent being found therein. Here are twenty-five of the thirty-one known live glaciers, eleven in the Fairweather Range (two in Lituya and nine in Glacier Bay), three in the St. Elias region, and eleven in Prince William Sound. As shown in Table 5 there are 170 glaciers of such importance or interest as to be named.

In the St. Elias region is the Malaspina Glacier, of enormous extent, being about twenty by sixty miles in area, and separated from the sea by a strip of forested moraines five to six miles wide, except where its magnificent ice cliffs enter the sea at Icy Cape.

Of the remarkable surroundings of the noble Gardiner Greene Hubbard Glacier, a most active ice river three miles wide, Muir writes:

> The scenery about the head of Disenchantment Bay is gloriously wild and sublime, majestic mountains and glaciers, barren moraines, bloom-covered islands amid icy, swirling waters, enlivened by screaming gulls,

hair seals, and roaring bergs. On the other hand, the beauty of the southern extension of the bay is tranquil and restful and perfectly enchanting. Its shores, especially on the east side, are flowery and finely sculptured, and the mountains, of moderate height, are charmingly combined and reflected in the quiet waters.

Prince William Sound is, however, the most remarkable region for glacial phenomena and living glaciers. With Valdez as a base, it offers opportunities for glacial study and observation unsurpassed elsewhere. Since the discoveries of the Harriman Expedition in College and Harriman Fiords, it offers eleven known living glaciers in Prince William Sound, of which the most remarkable for size and beauty are: Columbia, about four miles wide, 300 feet high; Harvard, Yale, Serpentine, Harriman, and Surprise.

Of Prince William Sound Muir writes:

All the fiords into which glaciers of the first class flow are encumbered, some of them jammed and crowded, with bergs of every conceivable form, which, by the most active of the glaciers, are given off at intervals of a few minutes with loud thundering roaring that may be heard five or six miles, proclaiming the restless work and motion of these mighty crystal rivers, so widely contrasting with the deathlike stillness and silence of the second-class decadent glaciers.

Of Harriman Fiord, Muir adds:

It is full of glaciers of every description, waterfalls, gardens, and grand old forests—nature's best and choicest Alpine treasures purely wild. Here we camped in the only pure forest of mountain hemlock I ever

Columbia Glacier, Prince William Sound: Front about 300 feet.

(South end, showing contact of glacier with forest.)

saw, the most beautiful of evergreens, growing at sea-level, some of the trees over three feet in diameter and nearly a hundred feet high.

Muir considers Columbia equally as imposing though less active than Muir Glacier. In the writer's opinion, it would be difficult to find a glacier more beautiful to the ordinary visitor than the Columbia, with its enormous mass and its wealth of color and form. Its striking background is offset by the frontal environment of flowery meads and noble trees. Few of the glaciers seen by the writer in the north surpass it in majesty, and none equal it in attractiveness of surroundings.

Mrs. Higginson, in her interesting "Alaska," says:

When seen under favorable conditions, the [Freemantle, renamed the] Columbia Glacier is the most beautiful thing in Alaska. One may have seen glaciers upon glaciers, yet not be prepared for the splendor and magnificence of the one that palisades the northern end of this (Columbia) bay.

The glacier has a frontage of about four miles, and its glittering palisades tower upward to a height of from three to four hundred feet.

In ordinary light, the front of the glacier is beautifully blue. It is a blue that is never seen in anything save a glacier or a floating iceberg—a pale, pale blue, that seems to flash out fire with every movement. At sunset its beauty holds one spellbound. It sweeps down magnificently from the snow-peaks which form its fit setting and pushes out into the sea in a solid wall of spired and pinnacled opal which, ever and anon breaking off, flings over it clouds of color which dazzle the eyes. At times there is a display of prismatic colors.

Across the front grow, fade, and grow again, the most beautiful rainbow shadings.

Of the glaciers of the interior two may be briefly mentioned, the Harvey, two by eight miles in size, and the Fidéle, both in the Mt. McKinley region. Of the latter, Cook writes:

The lower edge is seven and a half miles in width, its length forty miles. The lower ten miles are so thoroughly weighted down by broken stone that no ice is visible. It is thus the largest interior glacier of Alaska, and it probably carries more moraine material than any other glacier in the world.

Of the life of the glaciers, Prof. George Davidson, in his "Glaciers of Alaska," says:

There has been a general recession of the glaciers through the Aleutian Islands, the Peninsula of Alaska, and from Cook's Inlet to Portland Canal; except where they come directly or almost directly upon the broad ocean.

The evidence of advance seems clear at Taylor Bay, just inside Cape Spencer, at Icy Strait, since the survey of Whidbey; but the recent topographical survey by the United States Coast and Geodetic Survey shows a retreat behind the terminal moraine which it has left as a record.

The Malaspina Glacier has filled and obliterated the Icy Bay of Vancouver and Tebenkof; the recent Canadian survey indicates that the glaciers of Lituya Bay have shortened the deep arms described by La Pérouse; and the La Pérouse Glacier upon the ocean shore shows positive signs of advance according to the reports of the Harriman Expedition of 1899.

Nevertheless, in this region of advance the immense

ice blockade at the head of Yakutat Bay, so well depicted by Malaspina and confirmed by Tebenkof, has been carried away, and the Turner and Hubbard Glaciers now discharge into the sharp bend of the fiord at the head of the bay.

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CHAPTER XIX

MOUNTAINS AND VOLCANOES

In his nature studies, Ruskin says of great mountains:

They divide the earth, not only into districts, but into climates; and cause perpetual currents of air to traverse their passes in a thousand different states; moistening it with the spray of their waterfalls, closing it within clefts and caves, where the sunbeams never reach, till it is as cold as November mists; then sending it forth again to breathe lightly across the slopes of velvet fields, or to be scorched among sun-burnt shales and grassless crags; then drawing it back in moaning swirls through clefts of ice, and up into dewy wreaths above the snow-fields.

The beauty and force of this description must strongly appeal to those who have visited the stupendous land masses—the Fairweather, the St. Elias, the Wrangell, the McKinley, and the Alaskan mountain ranges—which extend in an immense semicircle of more than a thousand miles from the Sitkan region to the end of the Alaskan Peninsula.

In their abrupt rise from the sea, in their length as an uninterrupted mountain chain, in their contiguous areas of luxuriant vegetation and utter desolation, in their striking contrasts of volcanic lava and arctic snows, in the extent of their overlying and debouching glaciers—the Alaskan mountains offer wondrous as-

pects of nature, unmatched within an equal area by any other mountain masses of the world.

Nor are all Alaskan mountains of one class or of uniform pattern. The routine tourist sees the forested purple-peaked and snow-touched mountains of the Inside Passage, and the smooth-based, naked sierras of Lynn Canal. Beyond lie other and more striking types: the towering summits of ice-clad Fairweather, the jagged-peaked, ice-beset St. Elias Alps, the huge mass of Wrangell, the graceful, rounded green slopes of Kodiak, the symmetrical volcanic cone of Pavlof, and the majestic snow-crowned American monarch—McKinley.

It must not be thought that these grand and awe-inspiring mountain landscapes are inaccessible to the ordinary traveller, or even difficult of access. They are all reached in brief time and under comfortable conditions (see Chapter XXVII), except Mt. McKinley, of which distant and beautiful views are had from Fairbanks and the Tanana River.

There are four important mountain ranges, supplemented by subordinate groups. Except the volcanic Aleutian Range they are mountains of recent crustal uplift, modified by erosion.

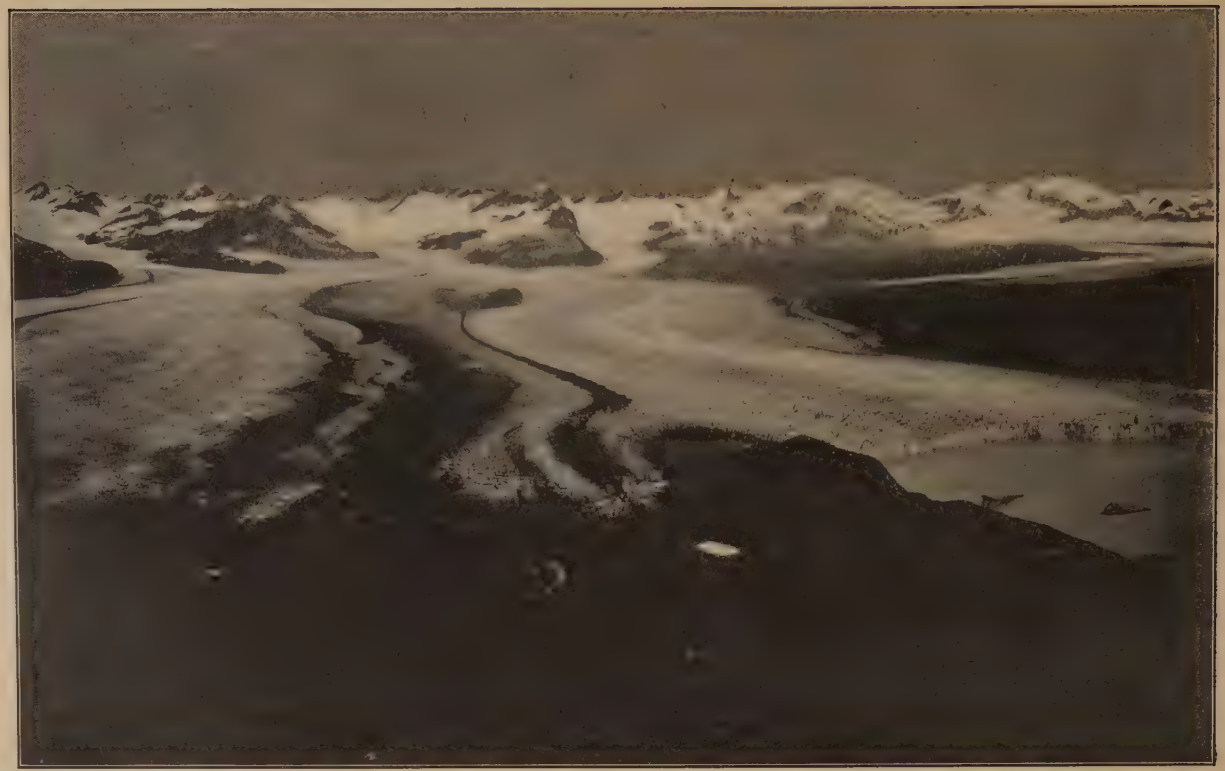
The Rocky Mountain extension crosses northern Alaska as the Endicott Range, nearly parallel with and about 200 miles inland from the Arctic Ocean. It decreases in elevation from about 8,000 feet near the Canadian frontier to 1,000 feet at Kotzebue Sound.

The Coast Range, consisting of the Fairweather and St. Elias Mountains, has a mean altitude exceeding

10,000 feet, and includes within its limits the most remarkable and extended glacier fields in America. Though of higher average elevation than the St. Elias group, the Fairweather Range is of more limited area. Its principal peaks are La Pérouse, 10,740 feet, Lituya, 11,832, and Fairweather, 15,292 feet, all rising, as it were, from the very sea, their steep declivities covered by great glacial sheets. The beauty and splendor of these mountains are beyond description, and in the mind of the writer unsurpassable. Mrs. Higginson writes of them:

> In all the splendor of the drenched sunlight, straight out of the violet sparkling sea, rose the magnificent peaks of the Fairweather Range and towered against the sky. No great snow mountains rising from the land have ever affected me as did that long and noble chain glistening out of the sea.

However, the St. Elias Range is still more remarkable through its combination of glacial fields and mountain masses. There are in this range nine peaks whose elevation exceeds 10,000 feet—Augusta, Cook, Hubbard, Huxley, Logan, Newton, St. Elias, Seattle, and Vancouver. Mt. Logan is the highest, 19,539 feet, but as it is not visible from the ocean St. Elias, 18,024 feet, is the dominating feature of the landscape, and is visible under favorable conditions about 150 miles from the sea. Its base washed by the Pacific Ocean, the main peak springs precipitously upward. Stupendous in its environment, as well as in its height, St. Elias beggars description. On near approach its beauty is enhanced by a bordering hem of pure white,



Névé of Fairweather Range, and Alsek Glacier.

the Malaspina Glacier, which follows the shore line for nearly seventy miles.

Of St. Elias, Russell wrote:

At length the great pyramid forming the culminating summit of all the region burst into full view. What a glorious sight! The great mountain seemed higher and grander and more regularly proportioned than any peak I had ever beheld before. The white plain formed by the Seward Glacier made an even foreground, which gave distance to the foot-hills forming the western margin of the glacier. Far above the angular crest of the Samovar Hills in the middle distance towered St. Elias, sharp and clear against the evening sky. So majestic was St. Elias that other magnificent peaks scarcely received a second glance.

The Wrangell Mountains are a group of irregular volcanic formation, with a mean elevation of 10,000 feet. They are separate from the Coast Range, and cover an area of about one hundred by fifty miles in extent. The main peaks are unsymmetrical lava cones, of which eight, Blackburn, Castle Peak, Drum, Jarvis, Regal, Sanford, Wrangell, and Zanetti, exceed 10,000 feet in height. It is known that there are quite a number of unnamed peaks that are of similar high elevation. The highest two of the known peaks are Wrangell, 14,005, and Blackburn, 16,140 feet. As later mentioned, Wrangell is an active volcano and with its neighbors forms a detached group, doubtless the eastern results of the volcanic forces that have played such prominent parts in the formation of southwestern Alaska.

Mrs. Higginson considers the Wrangell Mountain

views from Copper Valley "unsurpassed in the interior. Mount Drum, sweeping up splendidly from a level plain, is more imposing than Wrangell and Blackburn (from 2,000 to 4,000 feet higher). Glacial creeks and roaring rivers; wild and fantastic cañons, moving glaciers, gorges of royal purple bloom, green valleys and flowery slopes, the domed and towered Castle Mountains, the lone and majestic peaks, cascades spraying down sheer precipices—all blend into one grand panorama of unrivalled inland grandeur."

The Alaskan Range forms the southern boundary of the Yukon Basin, and extends from the International Boundary (where the mountains are named Nutzotin) westward, in a semicircle, to the region west of Cook Inlet. The range has a well-defined crest line, from 8,000 to 10,000 feet in elevation, which is unbroken for about 200 miles. Four peaks—Foraker, Russell, Spurr, and McKinley—(see Table 6) are above 10,000 feet, the last-named 20,464 feet, being the highest peak of America.

South of this range are the Chugach Mountains, of which Muir says:

The entrance to the famous Prince William Sound disclosed to the westward one of the richest, most glorious mountain landscapes I ever beheld—peak over peak dipping deep in the sky, a thousand of them, icy and shining, rising higher, higher, beyond and yet beyond another, burning bright in the afternoon light, purple cloud bars above them, purple shadows in the hollows, and great breadths of sun-spangled, ice-dotted waters in front. . . . Grandeur and beauty in a thousand forms awaited us at every turn in this

McKinley; the Monarch of American Mountains.

(View about 50 miles distant.)

bright and spacious wonderland. But that first broad, far-reaching view in the celestial light was the best of all.

The Aleutian Range, which extends from Cook Inlet southwest to the end of the Alaska Peninsula, is composed of typical volcanic cones which are treated later under the heading of volcanoes. The mountains only on the west shore of Cook Inlet are of very great height—Redoubt, 11,270 feet and Iliamna, 12,066 feet.

MOUNTAIN CLIMBING

As far as is known, the mountain peaks of Alaska offer no insuperable obstacle to their ascent. Lack of local transportation, however, makes their approach a matter of great expenditure of time and money.

The Duke of Abruzzi's experiences are recounted in his "Ascent of Mt. St. Elias." Dr. F. A. Cook's expedition is described in his "To the Top of the Continent," 1907; supplemented by the story of his companion, R. Dun, in the "Shameless Diary of an Explorer," 1907. Dun tells the story of his Wrangell climb (*Harper's Magazine*, March, 1909), under the title of "Conquering our Greatest Volcano."

VOLCANOES

Though viewed by the general public as a semi-arctic territory, yet Alaska affords the most striking phases of volcanic activity to be found in the western hemisphere, whether of ancient or recent times.

Dr. C. Grewingk, the best authority on Alaskan volcanoes, wrote in 1850:

We know of no more extensive theatre of volcanic activity than the Aleutian Islands, the Alaskan Peninsula, and the west coast of Cook Inlet. Here, within the limits of a single century, have all the known phenomena occurred: the elevation of mountain chain and islands, the sinking of extensive areas of the earth's surface, earthquakes, eruptions of lava ashes and mud, the hot springs, and explosions of steam and sulphuric gases.

An almost unbroken line of volcanic mountain ranges extends from Mt. Wrangell westward to the Commander Islands. There are no less than twenty-five of the Aleutian Islands on which active volcanic action has occurred, leaving forty-eight craters.

The following typical and widely separated volcanoes yet show signs of minor activity, and the accompanying dates are the years in which occurred the last violent outbreaks: Akutan, 1825; Iliamna, 1793; Makushin, 1826; Pavlof, 1825; Pogromni, 1831; Redoubt, 1819; Shishaldin, 1838; and Wrangell, 1819. As elsewhere stated, Bogoslof and Grewingk (New Bogoslof) are yet exceedingly active.

Of the three types—eruptive or true volcano, semi-eruptive, and uplift without eruption—Akutan, Makushin, and Shishaldin are illustrative examples of the first, while Bogoslof and Grewingk pertain to the last-named class.

Of the Alaskan volcanoes as a whole, Grewingk writes:

There are no descriptions of streams of burning lava. Eruptions within historic times have consisted

Crater of Augustine Peak.

Augustine (Dead) Volcano, Cook Inlet.

of ashes, stones, and liquid mud, seldom occurring within the true craters.

He adds that the only lava-made islands are St. Matthew, St. Michael, Stuart Islands, the Pribilof group, and perhaps Umnak.

Colonel Caine says of his visit to Cook Inlet:

During the first three months (June to September, 1902) Redoubt poured forth at intervals dense clouds of smoke and vivid sheets of flame, blackening the usually virgin slopes of snow on its sides with dark-gray volcanic dust. (He adds that according to local reports Wrangell broke out violently at that time.)

Of Pavlof, and the adjacent mountain country, at the west end of Alaska Peninsula, John Burroughs ("Summer Holidays in Alaskan Waters") writes:

The twin volcanic peaks of Pavlof rise from the shore to an altitude of seven or eight thousand feet, one of them a symmetrical cone with black converging lines of rock cutting through the snow; the other more rugged and irregular, with many rents upon its sides and near its summit, from which issued vapor, staining the snow like soot from a chimney. Sheets of vapor were also seen issuing from cracks at its foot near sea level (in 1899).

That this volcano has recurring phases of activity is evident from the statement of Captain Radclyffe in "Big Game Shooting in Alaska," who says that in July, 1903:

Mt. Pavlof suddenly burst out with a series of terrific explosions, which were repeated every five minutes, sending up clouds of steam and smoke, and shaking the ground around for miles.

Of the Aghilan Pinnacles, a remarkable succession of black castellated rocks west of Pavlof Volcano, Burroughs says:

A strange architectural effect amid the wilder and ruder forms that surround them, as if some vast many-sided cathedral of dark gray stone were going to decay in the mountain solitude. Both in form and color they seem alien to everything about them. Now we saw them athwart the crests of smooth green hills, or fretting the sky above lines of snow. Their walls were so steep that no snow lay upon them, while the pinnacles were like church spires.

The twin volcanoes, Pogromni, 6,500 feet, and Shishaldin, 9,387 feet high, are on Unimak Island, at the end of Alaska Peninsula. Of them John Burroughs writes:

Our first glimpse was of a black cone ending in a point. . . . It seemed buoyed up by the clouds. . . . There was nothing to indicate a mountain. Presently the veil was brushed aside, and we saw both mountains from base to summit and noted the vast concave lines of Shishaldin that swept down to the sea, and that mark the typical volcanic form. The long, graceful curves, so attractive to the eye, repeat on this far-off island the profile of Fujiyama, the sacred peak of Japan. The upper part, for several thousand feet, was dark—doubtless the result of heat, for it is smoking this year.

Mrs. Higginson well describes it:

In the absolute perfection of its conical form, its chaste and elegant beauty of outline, and the slender column of smoke pushing up from its finely pointed crest, Shishaldin stands alone.

One night in 1900 the writer saw the overhanging clouds of Shishaldin all aflame from volcanic action, and again saw the peak's graceful outlines by day, and finds it in form and beauty second, if at all, to the typical volcanic peak of Mayon, in far-off Luzon.

From 1825 to 1829, Pogromni (destroying desolation) and Shishaldin were violently active at intervals, new craters and fissures appearing with masses of red-hot lava, recurring flames, showers of ashes and stones, with other volcanic phenomena. Fortunately there has been no recurrence of violent action.

Bogoslof was formed by crystal uplift in May, 1796, when, after indications of volcanic disturbances, an observer on Unimak saw far out on the sea a black object, and there appeared

> Large flames of such brilliancy that on the island (twelve miles distant) night was converted into day, and an earthquake (occurred) with thundering noises, while rocks were occasionally thrown on the island from the new crater.
>
> After three days the earthquake ceased, the flames subsided, and the newly created island loomed up in the shape of a cone. About eight years elapsed before the island was sufficiently cooled to permit its examination.

In 1883 a companion volcano, New Bogoslof—now called Grewingk—was born. The history of its rapid and extraordinary changes in size and shape appears in the records of the fourteen visits and examinations between 1883 and 1899. When discovered, September 27, 1883, by Captain Anderson, it was "then in active eruption, throwing out large masses of heated rocks

and great volumes of smoke, steam, and ashes, which came from the apex and from numerous fissures, of which some were below the surface of the sea."

Captain Healy, of the *Corwin*, four times visited the island. He states that, in 1884,

Both peaks were inaccessible on account of the steam and fumes of sulphur in which they were enveloped. One night the volcano in the darkness presented a most extraordinary spectacle. The summit was enveloped in a bright sulphurous light, which burst forth from rifts in its side and shone out against the black sky, making a scene both beautiful and impressive.

Dr. C. Hart Merriam, from whose comprehensive account these descriptions are drawn, twice visited Bogoslof. Of the island, in 1891, he says:

The shape of the island did not in any way suggest a volcano, there being no cone and no true crater. . . . The new volcano was enveloped in steam, which issued from thousands of small crannies, and poured in vast clouds from a few great fissures and craterlike openings. . . . The steam was usually impregnated with fumes of sulphur. . . . Most of the rock was hot and pools of hot water were found on the beach.

Merriam's comments as to the absence of a true crater accord with the theory of Grewingk that

The falling in of mountains on the east coast of Bering Sea, the apparent swelling and bursting of whole sections of islands, are indications pointing to formation of peaks, craters, and crevices by elevation.

Grewingk Island (born in 1883), Bogoslof Group, Bering Sea.

(A third volcanic island was thrown up in 1906.)

In 1906 a third island was added to the Bogoslof group, being first seen on May 26. Dr. C. H. Gilbert says of this visit:

We were astonished to find that Fire (Grewingk) Island was no longer smoking and that a very large third island had arisen half way between the other two. It was made of jagged, rugged lava and was giving off clouds of steam and smoke from any number of little craters scattered all over it. Around these craters, the rocks were all crusted with yellow sulphur.

The new cone, occupying much of the space between the two older ones, was somewhat higher than either, but 300 feet would be an extreme figure. There was no evidence of any crater.

Its bases, undermined by the unceasing action of sea currents and storm waves, its cliffs wasting through wind and precipitation, its external material suffering disintegration by alternate action of superheated steam and arctic cold, and its structural stability impaired by uplifting and shifting internal forces, the entire Bogoslof group bids fair within a century to wholly disintegrate and disappear, as has the adjacent volcanic Ship Rock that antedated Old Bogoslof as an illustration of plutonic action in these seas.

(As this chapter is about going to press, renewed activity of the Bogoslof volcanoes is reported. Prof. George Davidson has received advices from Unalaska (April 10, 1909) that the Bogoslof volcanoes have been unusually active since March 1. Observers at sea have noted great clouds of smoke and steam

issuing from the Bogoslof group, while cloud reflections of volcanic fires have been seen at night, fifty miles from the islands.)

HOT SPRINGS

Despite its high latitudes and enormous areas of deeply frozen soil, Alaska has many hot springs. Though they are especially frequent in the volcanic mountains of the Aleutian Isles, yet they are found in southeastern Alaska, in the Yukon and Tanana Valleys, on the Seward Peninsula, and elsewhere.

In the southeastern region they occur without exception in granite belts, the water issuing from fracture planes. That opposite the Great Glacier, on the Stikine River, has the greatest outflow, about 1,500,000 gallons daily. Near Bailey Bay, Behm Canal, is found the hottest spring, of a temperature of 203° F., the water issuing in a jet 15 inches high and 1 inch in diameter. The Sitkan and a few other springs are credited with curative qualities, while some have a prospective commercial value for their carbonated waters.

Of the many Aleutian springs the best known are those in the volcanic mountains of Little Sitkhin, the most westerly of the volcanoes, those of the islands of Akutan and Umnak, and the sulphurous waters of Belkofski.

While the hot springs of the Serpentine, near Nome, are the fashionable health resort of Seward Peninsula, there are large outflows on the Kougarouk and on the Inmachi rivers; and far to the east in the Kobuk

Valley is a spring on Reid River, within the Arctic Circle, in 67° 20′ N., 152° W.

The waters at Hot Springs, on Baker Creek in the lower Tanana Valley, have the widest repute. More than fifty acres of ground are in a high state of cultivation within the favored area. A large hotel has been built, and all facilities for baths and thermal treatment have been installed, so that it has become a much-frequented watering-place.

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CHAPTER XX

INHABITANTS—WHITES AND NATIVES

DEFINITE information as to the population of Alaska is not obtainable, and among the reasons therefor are the rapid and frequent changes necessitated by Alaskan industries. Including those engaged in the fishery industries, it is believed that the summer population is fully 15,000 greater than that in winter, when the demand for labor falls off greatly.

By census there were 33,426 inhabitants in 1880, of whom only 430 were whites; in 1890, 32,052, of whom 4,298 were whites; and in 1900, 63,592, of whom 30,493 were whites—nine-tenths being males.

One of the best authorities, E. H. Harrison ("Alaska Almanac," 1908), places the white population at 40,000 in winter and the summer inhabitants at 55,000. The distribution assigned was: Seward Peninsula, 15,000; Tanana Valley, 15,000; southeastern and southwestern Alaska, 18,000; other districts, 7,000.

The whites are very largely of American birth, as, including the miners at Treadwell, Douglas Island, those of foreign birth in 1900 formed only one-sixth of the total white population. The Asiatics, almost entirely employed at the canneries, numbered 3,385, of whom 3,116 were Chinese.

Contrary to the oft-expressed opinion, the Alaskans

are neither reckless, dissipated, nor lawless. In the main they are law-abiding, hard-working, and temperate men. The rapid and successful development of the Territory has been the outcome of intelligent, persistent struggles on the part of self-respecting communities that are above the average of those in the United States proper. The writer has been familiar with mining camps and frontier settlements for forty years, and has never elsewhere seen the equal for high qualities of manhood that are usually found in Alaska. This is doubtless due in large part to the fact that Alaska is not a "poor man's country," as only men of some means can even reach the country, while considerable money and credit are necessary for the smallest ventures.

Tourists and prospectors travel everywhere without danger to life or person, though the adventurous can readily find associates of kindred and vicious qualities, if so inclined. It may be added that sojourn among the natives entails danger only on the rarest possible occasions, the killing of a peaceable white man by a native being almost unknown in recent years.

NATIVES

By census, the natives numbered in 1880, 31,240; in 1890, 23,531; and in 1900, 27,037.

Considered from the linguistic standpoint there are five native tribes, which in order of importance are as follows: Esquimaux, the Tlinkits (or Koluschantook), Athapascans, Metlakatlas (or Tsimpseans), and Haidas

(or Chimmesyan). They were divided as follows, according to the census of 1890: the Esquimaux, 14,012; the Tlinkits (or Koluschantook), 4,737; the Athapascans, 3,439; the Metlakatlas (or Tsimpseans), 952; and the Haidas, 391. In 1900, they were not enumerated separately, and the accuracy of the various enumerators has been questioned. Their increase or decrease is a matter of opinion, the writer believing that they are slowly vanishing as races.

This is not the place to tell the story of the Alaskan natives, which in its totality can only be viewed as disgraceful to a nation claiming to be civilized, humanitarian, or Christian.

In general, contact with the white man has steadily tended to degeneration among the four principal tribes of Alaska, though at times there have been spasmodic and usually fruitless efforts on the part of the United States to correct the most flagrant and degrading violations of personal rights and public decency.

The results of the labors of Christian men and women by personal service and moral teachings to raise the native to a higher plane of life and action are briefly outlined in another chapter. In several localities the educational opportunities of a quarter of a century have been so utilized that many natives are better qualified for the war with civilization, as regards its material aspects. In unfortunately too few cases there has been a development of moral virtues and strengthening of Christian character, but the general outcome is pitiful in the extreme. In a journey of over 2,000 miles through Alaska, the writer dis-

cussed the situation with a dozen or more missionaries, at nine separate stations and representing six religious bodies. Every one answered in the negative when asked if the natives had improved in honesty, the men in industry, the women in chastity, and the youth in promise of higher morality.

In mining towns and camps the saloon and dance-house, which foster in the men indulgence in liquor and offer to the young girls the allurements of finery and a life of apparent ease, are factors potent in degeneration and so attractive in appearance that only few natives withstand them. At remote points traders, fishermen, and whalers have been only too often guilty of gross misconduct destructive of the moral character and physical health of the unfortunate natives. The conduct of the white man toward the Alaskan natives is not unlike that shown toward the American Indian.

In former days the Alaskan Indians were divided into two classes, those of the coast and those of the interior. There are now popularly recognized the Tlinkits of the Sitkan Archipelago; the Aleuts of the Aleutian chain of islands; the Athapascans, of the interior watersheds of the Yukon, Kuskokwim, and Copper; and the Esquimaux, who fringe the shores of Bering Sea and the Arctic Ocean. Additionally, there are the Tsimpseans (better known as Metlakatlans), immigrants from British Columbia, and a few hundred Haidas.

Aleuts

Though numbering less than a thousand, the Aleuts are probably the most interesting of the natives, as having acquired certain benefits of civilization, with minor elements of its vices. Dwelling on the Aleutian Islands, with the seas as their field of occupation, they live largely on fish, varied in summer by a diet of berries and wild-fowl. Their peculiar cellarlike and sedge-covered huts are comfortable and fairly well-kept. On the larger and more accessible islands the construction of framed houses and the presence of gaudy lithographs, coal-oil stoves, granite ware, and cotton prints display the taste of the natives and the influence of the trader. The Aleut is docile, peaceful, a good husband and father, honest and industrious. Baptized in the Greek Catholic Church, and visited at least annually by a priest, he is fond of festivals and ceremonies, which are infrequently marked by excesses. Largely influenced by the Church, which uses a mixture of Russian and Aleut in its ceremonies, they have not taken kindly to American speech or education. However, the past neglect of the United States along these lines has been largely responsible for such existent conditions.

Athapascans

These interior Indians are steadily fading away, as civilization enters the valleys of the Copper, the Yukon, the Tanana, and upper Kuskokwim. In 1900, an epidemic of the measles and the grippe killed

off at least twenty-five per cent. of the Indians of the central and lower Yukon. In later years tuberculosis has made havoc with those remaining, and it has been said that more than half the deaths in many villages are from this dread disease. With the destruction of fur-bearing animals and the enormous slaughter of the caribou, there have come seasons of dire distress, so that in too frequently recurring years there are a large number of deaths from starvation. Only two things are certain—diminution of numbers and increase of misery.

Esquimaux

About sixty per cent. of the natives are Esquimaux, who are found in all parts of Alaska except to the southeastward of Prince William Sound. Contrary to the general opinion, their main habitat is not along the shores of the Arctic Ocean. Less than one-fifth live within the Arctic Circle, while the favorite and most populous district is the coastal plain of Bering Sea, from the Kuskokwim mouth to the Yukon Delta, where fully forty per cent. of the Esquimaux live permanently.

Peaceful and docile, trustful and generous, the Alaskan Esquimaux have gained a precarious living from adjacent seas in summer and from the lakes and tundras in winter, principally by fishing. More than any other Alaskan race they have suffered by contact with the white man. The whale and walrus are practically annihilated, land animals have likewise disappeared, the Seward Peninsula is one great mining camp, and

Bristol Bay is the great centre of the salmon fishery. These vitally changed conditions of life have seriously affected the Esquimaux, who find their means of subsistence largely destroyed, their habitat invaded, and new methods of life forced upon them. Decimated by epidemic diseases introduced by the whites, victims of unprincipled liquor dealers, often maltreated by vicious traders and exploited by the unscrupulous trader, the steady degeneracy of these hospitable, merry-hearted, and simple-minded people is apparently a matter of brief time. As elsewhere shown, the introduction of the reindeer, the efforts to teach industrial methods, and the rendering of medical aid to the suffering, are the only redeeming and hopeful features of the Esquimaux situation at present.

Fortunately, the very barrenness of the Yukon-Kuskokwim coastal region is in itself a partial protection to these so-called children of the ice. Here, apart from the white man, they are yet able, through fish and seal, to eke out a bare sustenance in good years, while in bad seasons the old and sick give up their lives so as no longer to imperil the enfeebled and starving community.

Haidas

Less than four hundred in number are the Haidas, part of the Queen Charlotte Indians. Known to tourists of southeastern Alaska for their basketry, hats, and ornamental carvings, they play no part in Alaskan native life.

Metlakatlas

The Tsimpsean Indians, under the leadership of their devoted missionary, William Duncan, immigrated in a body from near Port Simpson, British Columbia, to obtain greater religious liberty, to Alaska in 1887. On March 3, 1891, Congress set apart the Annette Islands, now popularly known as Metlakatla, as a reservation "for the use of the Metlakatlan Indians and those personally known as Metlakatlans, who have recently emigrated from British Columbia to Alaska, and such other Alaskan natives as may join them."

The town of Metlakatla is perpetual evidence of the soundness of Governor Swineford's judgment regarding the capabilities of Alaskan natives. They labor at fishing, in the cannery, in the saw-mill, live industriously and exemplarily in the clean, well-ordered, and picturesque village that is the work of their brains and hands. They have built a church, a school-house, town-hall, guest-house, saw-mill, cannery, several stores, and many comfortable dwellings —in short, they are a community that does not compare unfavorably with any white settlement in Alaska in thrift, comfort, and order.

Repeated efforts to reduce the size of the reservation and open it to whites have so far failed, and should fail. Their isolation has been a most favorable factor in the prosperity of the Metlakatlans, and complete success can only be expected in Alaskan missionary work through rigid separation of whites and natives. Missionaries recognize almost universally that the

white men seek intercourse with Alaskan natives only for exploitation or debauchery.

While in late years some Tsimpseans have settled elsewhere, so as to be more independent and individual, yet the greater number wisely adhere to the communal life which has so improved their material, mental, and moral conditions.

Tlinkits

The habitat of the Tlinkit Indians extends from the southeastern boundary of Alaska to the mouth of Copper River. In consequence he is the Alaskan Indian, as far as the experience of the summer tourist extends. There are twelve subdivisions of the tribe, but in general the Tlinkits are divided into two clans: the Wolf, which has minor branches, such as Bear, Porpoise, Eagle, etc., and the Raven, to which belong the Frog, Owl, Sea Lion, and Salmon. Marriages are invariably made between members of different clans, as those of the same clan are assumed to be within prohibited degrees of consanguinity.

Hereditary chieftains and slaves formerly filled the upper and lower tribal positions, but slavery is now extinct and the claims to higher station and power on account of birth are steadily weakening.

Originally marine nomads, with settled habitats in winter alone, these Indians have, under changed conditions, become permanent in their residences. The original disinclination of the men to work has disappeared under the stimulus of artificial wants, so sedulously fostered by the whites and favored by

native women. The mechanical skill of the men is well known, having in the past been applied to the carving and erection of artistic totem poles, the construction of large log houses, and especially in the building of war canoes, usually from a single huge tree, and their elaborate carving and ornamentation. These huge canoes, capable of carrying sixty to seventy warriors, are now rarely seen, giving way to small boats fitted for sea and coast fisheries. The totem poles, formerly ornamented by elaborate and curious carvings, related in a manner to their clan connections, family history, and pedigrees. While small totems are now made for trading and sale, yet the old order of family coat-of-arms, as one may say, has passed among the younger generation. The skill in copper forgings, once so highly prized, has yielded to cheap iron and steel from the trader.

The women were once famous for their closely woven, plant-dyed blankets of mountain-sheep wool, the cherished form of personal wealth, but now they apply the least work consistent with the untrained demands of summer tourists to imported wools colored by aniline dyes. Similarly, there has been marked decline in the basketry methods and styles, which formerly were so artistic and pleasing.

In short, the Tlinkits have changed from a warlike, proud people to the positions of hewers of wood and drawers of water. They live through labor in the saw-mills, canneries, and fisheries, that are the main industries of the Sitkan Archipelago, supplemented on the part of the women by shrewd and profitable

curio trade with the summer tourist. Gradually the natives are engaging in the minor operations as miners, wherever the union does not emphatically forbid. Industrial training, along with their peculiar gifts, is hesitatingly but fairly well received, especially by the men, and the Tlinkit has become a valuable factor in the development of southeastern Alaska, justifying the faith of the first American Governor, A. P. Swineford, who, in his annual report for 1885, writes:

All the natives are self-sustaining. They are far superior intellectually, if not in physical development, to the Indian of the plains; are industrious, more or less skilful workers in woods and metals. They yield readily to civilizing influences, and can, with much less care than has been bestowed on native tribes elsewhere, be educated up to the standard of a good and intelligent citizenship.

Despite the fact that the average Tlinkit is self-supporting and resourceful, there is no solidarity among them, and their steady decline in numbers and importance is probable. The United States takes no active interest in the care of the helpless and unfortunate, and private charity is inadequate to a task almost hopeless in the beginning.

GENERAL CONDITION OF NATIVES

This subject has engaged the earnest attention of the writer for eight years, extending from personal observation during the fatal epidemic of 1900 to official investigations initiated by him when Alaska was within his military command from 1906 to 1908.

In 1905 the writer, at the request of the late Ethan A. Hitchcock, then Secretary of the Interior, also made a personal study of the problem, during an inspecting tour through Alaska. It appears certain that general and indiscriminate charity is not only undesirable but also deleterious in its effects. My official recommendations looked to especially encouraging the Indians to help themselves. To this end it was suggested that there should be employed Indian inspectors, whose moral influence should be strengthened by clothing them with a certain coercive authority. Such inspectors should be medical men with the true missionary spirit. Their specific duties were to furnish treatment to natives remote from medical aid. There was to be instruction in, and enforcement of, sanitary methods, supplemented by industrial training suited to the environment; finally, there was to be the minimum of food and clothing issues.

These suggestions, appear to have had weight, for the Bureau of Education furnished the following year medical supplies and text-books to eleven Indian villages destitute of medical means. The Secretary of the Interior also set aside $5,000 to be spent by officers of the army in affording relief in emergent cases of great destitution and need.

Medical investigations, directed by the writer at two widely separated points—Haines Mission and Eagle—disclosed shocking conditions of disease and sanitation. At one place more than half the natives were afflicted with contagious diseases—tuberculosis (forty-eight per cent.) and trachoma (seven per cent.). Twenty-four

per cent. of the children die as infants and sixteen in childhood. The investigations covered over 600 Indians. The natives were reported at one place as largely free from prejudice, "tractable, easy to teach, and eager to learn."

Many high officials of the nation have publicly deplored the condition of the natives, and President Taft, when Secretary of War, officially recommended legislative action in his annual report of 1906, saying: "From time to time during the past four years the War Department has been called upon to extend relief to destitute natives. This destitution (he adds) is owing to increasing scarcity of game, and the decline in the run of the salmon, due in large measure to the ingress and encroachments of the whites, and from the ignorance and improvidence of the Indians themselves." He recommended: "The adoption of radical measures of relief not only from a standpoint of humanity, but from that of the moral obligation and honor of the nation."

Every thoughtful man must realize the moral duty of this nation toward those whom we have materially, morally, and physically injured—especially to those of the extreme northwest. To these natives, Prof. W. H. Dall, an authority from his extended associations with them, covering with intervals forty years, pays the following deserved tribute:

The men of the Yukon had, like other men, their careers, affections, tragedies, and triumphs. The valley whose rim enclosed their world was as wide for them as our world is for us. It is certain that for their

world they had worked out problems which we are still facing with trepidation in ours. No man went hungry in a Yukon village. No youth might wed until he had killed a deer, as token that he could support his family. The trail might be lined with temporary caches, yet no man put out his hand to steal. Men were valued by their achievements and their liberality.

Such were the men of the Yukon, to whom civilization and the greed of gold brought drink, disease, and death. The fittest has survived, but the fittest for what?

What, if anything, does the General Government owe the natives of Alaska, and in what form shall the payment be made? It is a problem great in its moral as well as in its practical aspects. Having largely destroyed their food supplies, altered their environment, and changed their standards and methods of life, what does a nation that has drawn products valued at $300,000,000 owe to the natives of Alaska? Will this nation pay its debts on this account?

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CHAPTER XXI

EDUCATION AND MISSIONS

American polity looks to the universal education of the people at public expense and under government control, leaving religious instruction to private initiative. The United States for a quarter of a century was, however, equally indifferent to both the moral and the mental training of Alaskan natives, which thus devolved entirely on the liberality and activities of Christian men and women, until in very recent years means and methods of secular education were evolved.

Under the Russian régime, education in Alaska was confined to a few religious and secular schools. The first, connected with Russian Greek Church missions, confined its efforts to training native priests; and the latter class, under the Russian-American Company, practically educated selected natives and half-breeds for employment as mechanics, navigators, and ship carpenters, but these training schools fell into decay about the time of the cession.

It should be added that the natives of Kodiak and several of the larger Aleutian Islands have been regularly educated since that great and noble Russian, Father Veniaminof, systematized the work and increased its efficiency by devising and publishing an Aleut-Russian grammar, which is yet in use.

American governmental control left to absolute neglect for eighteen years the important question of education, in connection with other similar administrative problems that pertain to every Christian and self-respecting nation. Stimulated by appeals from officers of the army, American missionary societies were not entirely neglectful of Alaska's necessities, and in 1877 the Presbyterians, through their agent, Dr. Sheldon Jackson, established schools in southeastern Alaska, their example being soon followed by other missionary societies.

The Alaska Commercial Company maintained under its control an English school on the Seal Islands, but the results have always been unimportant owing to the influence and competition of the school of the Russian Greek Church.

The United States was finally forced by public opinion to a tardy and meagre assumption of its duties toward the natives—obligations assumed under the treaty of cession and also necessitated by regard for national morality.

In accordance with the law of May 17, 1884, the Secretary of the Interior, in 1885, charged the Commissioner of Education with the "needful and proper provision for the education of the children of school age in the Territory of Alaska, without reference to race." The pitiful sum of $25,000 was appropriated, and for the following ten years the school system, pecuniarily unable to install its own plant, was maintained largely by contracts with the missions, which generously supplemented the deficient support of the nation.

AMERICAN SCHOOLS

The question of education was brought indirectly to public attention by the influx of whites into the Territory in 1898, which necessitated the establishment of civil government in Alaska. In the law of June 6, 1900, for this general purpose, provision was made authorizing incorporated schools, which should be maintained by fifty per cent. of the fund arising from license fees collected within their corporate limits.

In 1901, Congress withdrew all national support for education, and the expense of all schools devolved on Alaska, to be met from license moneys. Better counsels prevailed later, and by the law of January 27, 1905, regarding roads, schools, and the insane in Alaska, the education of white children devolved on local officials, while that of the natives remains under the Secretary of the Interior and at the expense of the United States, which appropriated $200,000 for this purpose in 1908.

Public schools are now of three kinds—town, territorial, and native. Those of incorporated towns, Juneau, Eagle, Nome, Valdez, Ketchikan, Skagway, Douglas, Wrangell, Fairbanks, are under three school directors, elected by the people and supported by the revenue from Federal licenses levied on local business, an ample fund in most towns. These directors by law "have exclusive supervision, management, and control of the public schools and school property."

The territorial schools outside of the incorporated towns are under the Governor, as *ex-officio* superintendent, and are maintained from Federal license funds collected from the Territory at large. The native schools are controlled by the United States Commissioner of Education, and their support is through appropriations from Congress. Native education is especially in charge of the chief of a sub-bureau known as the Alaska Division, with headquarters in Washington city. Of the two local superintendents, one is located at Teller, in charge of schools north of Cook Inlet, and the other at Sitka, in charge of the schools from Ketchikan to Yakutat. There are sixty-one native schools, of which forty-five are provided with government buildings, the others being principally kept in structures belonging to mission societies. The school year covers from eight to nine months, and the teachers receive an average annual salary of less than $800. School attendance is irregular, and in many cases very discouraging. The enrolment of native children rose from 2,136 in 1906, to 2,369 in 1907, and 3,067 in 1908. The cost of each pupil present was $63.55, with an average attendance of only forty-eight per cent. in 1907, which fell to thirty-nine per cent. in 1908. Methods to prevent truancy have been diligently and fruitlessly sought, but Congress seems favorably inclined toward enacting such legislation as will make school attendance obligatory to a certain degree.

INDUSTRIAL TRAINING

The efforts to improve the condition of natives, by their instruction in agricultural and industrial pursuits, have met with considerable success. Training in agriculture and in boat building has been especially satisfactory at Sitka. At Unalaklik quite a number of small schooners have been built, manned, and operated entirely by Esquimaux. In several schools cooking, sewing, dressmaking, and basketry have been taught to native girls.

Enlarging its sphere of usefulness, the United States Board of Education has provided means of medical treatment for many isolated Indian villages. It also initiated plans for systematic and suitable industrial training, which will conform to special local industries and consider the crying needs of the natives: from this method marked benefits should result.

At present, the means and methods of educational establishments in Alaska may be considered as quite satisfactory, though desirable improvements are recommended by the authorities, particularly the extension of school facilities to the less populated Aleutian Isles and an increase in the supervising force.

As elsewhere stated, the mission schools render most valuable service, aiding and supplementing the Federal system.

MISSIONS

The enduring bases of missionary work in Alaska were laid by that remarkable man, Innocent Veniaminof, who died as Primate of Russia. Laboring as-

siduously for nineteen years, 1823–1842, as missionary and priest in Alaska, he exerted an extraordinary influence over all natives that came under his supervision.

The treaty of cession provided "that the churches which have been built in the ceded territory by the Russian Government shall remain the property of such members of the Greek Oriental Church resident in the territory as may choose to worship therein." Although its Russian communicants very largely departed, the Greek Church, to its great credit, kept alive for twelve years in Alaska, under alien and discouraging conditions, the feeble flame of Christian faith; even now the Russian Church pays five-sixths of the salaries of its Alaskan priests. To this day the Russian Church maintains its active and financial interest in Alaska, and its bishops and priests still officiate in churches at Sitka, Kodiak, Unalaska, and St. Michael, besides keeping up its mission work at Ikogmut and elsewhere.

In addition to the Greek cathedral at Sitka, there were, in 1900, seven parishes and thirty-four minor churches with twenty-seven chapels. Their field of operation lies largely on the fringing islands of southern Alaska and in the Aleutian Archipelago—from Sitka to Atka, the Seal Islands, and the western Aleutians, though it has missions on the Yukon and Kuskokwim. Yearly visits are made by priests to minor settlements where there are but few natives. Those who think that the Greek Church is dead in Alaska will be surprised to learn that in 1890, although there were missions representing eleven faiths, the

Greek Church had 10,335 communicants as against 1,334 of Protestant faiths and 498 Catholics. Of the 10,509 who were within the pale of the Church in 1905, only 59 were Russians and they mostly clergy. Criticisms regarding Greek formalism and the efficiency of its clergy are often heard, but so are similar disparaging remarks in Alaska as to the consistency of doctrine and practice as set forth in the lives of missionaries and teachers of other faiths. The Christian and tolerant view of the local head of the Greek Church is shown by the recommendation of the Alaskan bishop in 1905, that Russian and Aleutian should be replaced by the English language in all exercises.

PROTESTANT MISSIONS

Suffice it to say, that as a body the representatives of the various churches in Alaska are devoted, self-sacrificing men and women, who labor faithfully and strenuously for the welfare of the natives, often under the most discouraging and trying circumstances. The advent of American churches into this field came after twelve years of hesitation, and then through the efforts of the United States Army. Sheldon Jackson says: "Christian women, wives of army officers stationed at Sitka and Wrangell, were continually writing to their friends concerning the need of missionaries." With the aid of General (then Captain) S. P. Jocelyn, United States Army, the first Indian church outside of the Greek pale was opened at Wrangell in 1876. The next year a soldier, whose name is

unknown, wrote General Howard, asking that some church send a minister to guide and instruct these Christian Indians. This letter was sent to Dr. Sheldon Jackson, who made such prompt and effective representations that he was sent, in 1877, to institute the first Presbyterian mission in Alaska. The number eventually increased to six—Wrangell, Sitka, Hooniah, Howkan, Haines (all in Sitkan Alaska), and at Point Barrow. The most important work for uplifting the Indians, practically as well as spiritually, has been the development and extension of the Sitka Industrial School, in which ex-Governor Brady was for many years the dominant and inspiring spirit. There are accommodations for about 160 pupils, both boys and girls, who are trained industrially and religiously. Formerly the pupils were from Sitka or adjacent islands, but they now represent three tribes and are recruited from distant points in southeastern Alaska.

The efforts of the Baptists in Cook Inlet, on Copper River, and Prince William Sound, have been supplemented by establishing an orphanage at Wood Island, Kodiak. Of the six missions of the Methodists, the most important is a girls' home at Unalaska, which, with the Baptist orphanage, have done much to make useful and honest the lives of the helpless waifs, for whom otherwise there were scant hopes of the future.

The Swedish Lutheran Church has three missions —at Yakutat, Golofnin, and Unalaklik—while the Norwegian Lutherans took station at Teller. The last three missions have become especially important from their association with reindeer work, later mentioned.

The most northern mission, at Point Barrow, was opened by the Presbyterians. As Point Barrow is a whaling centre, has a trading post, and is occupied as a governmental relief and life-saving station, it is a highly important outpost, and the mission influence is correspondingly necessary. Altogether, the Presbyterians have established sixteen churches, of which twelve are for natives.

The Moravians have a mission at Kwinak village, at the mouth of the Kanektok. They also opened two missions, Bethel and Carmel, under contract with the United States Bureau of Education, to establish schools in connection therewith. Bethel was founded in 1885, near the Esquimaux village, Mumtrelak. Its usefulness has been largely increased in late years by its herd of reindeer, which in 1907 numbered about 2,100. Carmel was opened in 1866, near the Esquimaux village Kanulik on the Nushagak River. In addition to its religious work it has instituted industrial schools for boys and for girls, which have materially benefited the Esquimaux who, to the number of several thousands, live in that region.

The Society of Friends, beginning operations at Douglas City, extended their work to the Kotzebue Sound region, where they have at present three missions—Deering (now an important mining centre), Kotzebue, and Kikiktak. They have given much practical instruction and are actively interested in training apprentices for the reindeer, which, to the number of 845 and 1,193 (in 1907) head, were collected at the two latter stations. The Kotzebue school had the

St. James Mission, and Native Children, at Tanana, Central Yukon.

largest enrolment in 1907, 120 pupils, of any Federal school.

The Kinegnak mission at Cape Prince of Wales, and that on Shismaref Inlet, are supported by the Congregationalists. The Esquimaux villages of Kingegan and Kinegnak, of several hundred natives, from their association with whalers, liquor smugglers, and prospectors, have great need of guidance. The institution of this mission has been supplemented by a Government school with 105 enrolled pupils, and a reindeer station, in which there were 1,261 reindeer in 1907.

Though late in entering the field, the Episcopal Church has pursued its Alaskan work with great vigor. It opened a mission and school at Anvik in 1887, and has steadily extended its operations in the shape of schools, hospitals, and churches, occupying twenty-three stations in 1908. Alaska was organized as a missionary diocese in 1888, but its first bishop, P. T. Rowe, was not ordained until 1895. With his diocesan residence at Sitka, Bishop Rowe has stimulated missionary zeal by extraordinary personal efforts in the field. He has made winter journeys of thousands of miles, following the sledge through Alaskan cold and darkness to encourage the missions on Bering Strait, and in the valleys of the Tanana, the Yukon, and the Koyukuk. The most promising of missions lately established is that on the Koyukuk, which, from its isolated position, is free from the disadvantages inseparable from those at or near white settlements. The conditions of the service, despite Bishop Rowe's personal efforts, are indicative of the great difficulties

under which missionary work is done by all churches. Of the twenty-three stations in 1908 there were no less than eight vacant, while three had only a native helper.

Fidelity, faith, courage, above all practicality and administrative ability, are essential qualities for missionary work in Alaska, where climate, environment, and isolation are all adverse to successful work.

The most striking and favorable results through mission work among the Tsimpseans are in evidence at Metlakatla, the Indian community transferred from British Columbia, some fifty miles to the eastward, in 1887. Mr. Henry S. Wellcome, an able and warm-hearted champion in their days of oppression, in his most interesting "Story of Metlakatla," says:

> This people, only thirty years since, consisted of the most ferocious Indian tribes, given up to constant warfare, notorious for treachery, cannibalism, and other hideous practices. Mr. William Duncan, with rare fortitude and genius, began single-handed a mission. He educated them and taught them Christianity in the simplest manner; at the same time introducing peaceful industries; and by these means he wrought in a single generation a marvellous transformation. Where blood has flowed continually he founded the model, self-supporting village of Metlakatla, of one thousand souls, that will compare favorably with almost any village of its size in England or America for intelligence, morality, and thrift.

CATHOLIC MISSIONS

In addition to its labor elsewhere among the whites, the Catholic Church has contributed much to the material as well as the spiritual advancement of the Yukon natives, especially at Nulato and Koserefski, the better known Holy Cross, on the lower Yukon. Conditions are not favorable for great improvement at Nulato, where there is a shifting native population, varying from 250 to 350, owing to its being the centre of trading operations for that region. Between liquor dealers, traders, steamboat men, and prospectors, the environment is somewhat irreligious. Great benefits and extraordinary success have attended the work of the Holy Cross mission, which was wisely established apart from villages or posts, across the Yukon from the Indian village of Koserefski, population from 300 to 400. Despite predictions of failure as to agriculture and stock-raising, this mission, established in 1886, is a striking evidence of what zeal, intelligence, and labor can do in an unfavorable environment. Some forty acres of land are under high cultivation, yielding such wealth of vegetables, forage, and flowers as must be seen to be fully appreciated. The Jesuit fathers have supervised the construction of substantial log buildings for house, school, and church; the bringing of the land to cultivation; the construction and operation of a steamboat; and have fostered successful methods of fishing. The sisters, meantime, conjoin, with primary instruction for the girls, methods

of household economy, instill a useful knowledge of womanly duties, and inculcate lessons of moral value. From fifty to sixty children are here taught each year, very greatly to the benefit of the Esquimaux who live in adjoining regions.

REINDEER

The wholesale destruction of land game, the practical extermination of sea game, and the displacement of natives in many places by the influx of miners and prospectors, wrought such disturbances in the economy of native life that the extermination of thousands by starvation was imminent. Among other methods suggested to improve permanently the condition of the natives, especially of the Bering Sea region, was the importation of Siberian reindeer. This action, inspired by Dr. Sheldon Jackson, promises in its results to be the most important benefit ever accorded the natives by the United States.

Doubtless in this, as in other novel and extended enterprises, there were errors of administration and policy, with exaggerated expectations and consequent disappointments, but, as a whole, the policy was wise and the results valuable and far-reaching.

Initiated by Dr. Jackson in 1892, Congress came to its support, and between 1894 and 1908 appropriated $240,500 for the import and support of deer. Importations aggregating 1,280 were made from 1892 to 1902, when the Russian Government withdrew its permission for such purchases and shipments. The herds have rapidly increased, have been invaluable

Holy Cross Mission, Lower Yukon Valley.

(Remarkable for its successful agricultural work.)

for food supply, and in cases have rendered important and timely service in transportation.

There have been three classes of stations: (1) Government, entirely under Federal control; (2) Mission, where herds are loaned for industrial training, an equal number to be eventually returned; (3) Relief, maintained at suitable points for emergency purposes.

On June 30, 1907, there were twenty-four stations, the most important being Point Barrow, with 629 deer (1905 figures); Kotzebue, 732; Teller, 941; Wales, 942; Eaton, 1,008; Unalaklik, 1,020; Golofnin, 1,164; and Bethel, 1,329.

The herds now aggregate about 20,000; at the last detailed report on June 30, 1907, numbering 15,839, of which 4,519 were fawns. The policy of the Interior Department looks to the gradual and early transfer of all deer to industrious and worthy natives, as rapidly as competent and worthy men are available. In order properly to distribute the reindeer and foster their care and breeding, small herds were loaned to such missions as agreed to train Esquimaux apprentices as herders and return at the end of five years the number loaned, retaining the increase.

In past years loans or gifts of reindeer have been made to the Congregational missions at Wales and Shishmaref, to the Swedish Evangelical Union missions at Golofnin and Unalaklik, to the Society of Friends missions at Deering and Kotzebue, to the Norwegian Evangelical Lutheran Mission at Teller, to the Moravian Mission at Bethel, to the Catholic Mission at Holy Cross, and to the Methodist Mission at Sinuk.

The imported Lapps and certain natives have prospered in the reindeer industry. There are five Lapps and nine natives who owned in 1905 more than a hundred deer, the richest native being Ke-ok, of Deering, with 327 deer, closely followed by Mary An-drewuk, of Eaton, often called Reindeer Queen, with 317 head. Altogether there were in 1905 seventy-five natives owning deer. Owners may kill surplus males and sell their meat and skins, but female deer are not allowed to be sold to white men.

The satisfactory results of the system are shown both by the increase, and also by the ownership, which in 1907 was vested to the extent of fourteen per cent. in Lapp instructors, twenty-two in missions, twenty-three in the United States, and forty-one per cent. in Esquimaux reindeer herders and apprentices. Unfortunately, the benefits of the reindeer service are strictly limited, as is shown by the fact that only 114 Esquimaux, about one per cent., own deer. The greatest benefit, however, is moral and educative, instilling a personal self-respect, sense of ownership, and inclination to self-support.

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CHAPTER XXII

SOUTHWESTERN ALASKA AND KODIAK

Outside of the usual route of excursions lie the Kenai and Alaska Peninsulas, and the adjacent Kodiak Archipelago. By a steamer that leaves Valdez about the middle of each month the traveller reaches certain of the villages and settlements, but special local transportation is necessary to carry out any plans for business or pleasure.

In a measure these are unknown regions, which are well worth either a casual or extended visit for those interested in the fauna and flora of high latitudes, the forms and forces of volcanic action, or the observation of the various tribes which are found in this area.

KENAI PENINSULA

Kenai Peninsula is heavily timbered throughout, its mountains being forested up to an altitude of about 2,000 feet. While the timber is principally spruce, there are large areas of hemlock, birch, poplar, and other less valuable woods. Many of the valleys opening toward Cook Inlet are fertile lands, suited to the production of the more important vegetables and clothed with fine grass of such quality and abundance as enable stock in many places to live on the winter

ranges. Berries are in great abundance, and game of many kinds is plentiful. While the small streams are not well supplied with fish, yet the rivers swarm with salmon in season. The banks in the adjacent seas are frequented by cod in great numbers and by halibut to a certain extent. Apart from its resources of gold and coal, elsewhere mentioned, and its game, timber, and agricultural possibilities, its landscapes of grandeur and picturesqueness are varied and imposing.

There is quite a population on Kenai Peninsula, which lives on its industries of mining, lumbering, fishing, hunting, and for several years in the work of railway construction.

The peninsula was brought prominently before the public by the project of connecting the new town of Seward, on Resurrection Bay, with the gold placer mines of the Tanana Valley, by a route north to Turnagain Arm, west of Sunrise, and thence up the valley of the Susitna. Financial difficulties have thrown the road into the hands of receivers, and construction work is suspended. The initial point was located at Seward owing to the upper part of Cook Inlet being closed from November to March by ice.

The gold mines of Turnagain Arm, brought into disrepute in their early days by ill-advised methods and unsuitable or worthless machinery, are productive and profitable on a small scale. The Arm, however, is an important base for the placer-mining operations to the north in the watershed of the Susitna and Yentna.

The lignites of the Kachemak Bay region are in

Seward, Kenai Peninsula.

(Terminus of the Alaska Central Railroad.)

large quantities and furnish a coal fairly good for steaming purposes, but under existing labor conditions its exploitation is not economically attractive. Later, with the extension of the Alaska Central Railroad, the high-grade coals of the Matanuska Valley will prove profitable (Chapter XIII).

COOK INLET NATIVES

The natives of this region are of various tribes, and thus the visitor is able to contrast the characteristics of the different types. On the extreme northern coast the interior Indians, the Athapascans, are found. On the southern shores are the Kodiaks, of an Esquimaux type, and at the end of Alaska Peninsula are scattering Aleuts. In addition there are Creoles on the west shores of Kenai Peninsula, of mixed Russian and native blood. The Creoles are scattered along the coast at Hope, Kasilof, and other small settlements, but the greater majority are at Kenai and Seldovia. They have schools and churches, under the Russian Church, and make a living by hunting, trapping, fishing, and when occasion offers as laborers or guides. In addition to lighterage and placer mining, they form a considerable part of the working force at the salmon canneries at Kasilof and Kenai, and are also found at the local saw-mills and lumber camps.

Game has been very abundant on Kenai Peninsula, and yet exists in large numbers. The most valuable and interesting species are brown and black bears, moose, mountain sheep, and foxes. The Kenai moose

are among the largest known, and they are hunted vigorously both for trophy antlers and for meat, which is sold in large quantities, with the meat of mountain sheep, to the miners and prospectors.

Of scenery Burroughs writes of Kachemack Bay:

Grandeur looked down on it from the mountains around, especially from the great volcanic peaks, Iliamna and Redoubt, sixty miles across the inlet to the west. The former rises over 12,000 feet from the sea, and, bathed in sunshine, was an impressive spectacle. It was wrapped in a mantle of snow, but it evidently was warm at heart, for we could see steam issuing from two points near its summit.

Familiar with the beauties and attractions of Kenai, Mr. A. J. Stone [1] delightfully describes it:

It is a land of magnificent, rugged mountains, and of beautiful rolling meadow lands; a land of eternal fields of glistening snow and ice, and of everlasting fires of burning lignite; of frozen moss and lichen-covered plains, and of vegetation that is tropical in its luxuriance; a land of extensive coal-fields, smoking volcanoes, and of earthquakes so frequent as to fail to excite comment among its native residents; of charming quiet bays and harbors, and of tides and tide-rips among the greatest in the world; of almost endless days in summer, and of long, dismal winter nights; of an abundant animal life both in the water and on the land. Nowhere else in the world does nature exert itself in so many ways as in the Kenai Peninsula.

The waters, the mountains, the great rivers of ice,

[1] "An Explorer Naturalist in the Arctic." *Scribner's Magazine*, vol. xxxiii, p. 38.

the vegetable and animal life, all vie with each other in the production of something unusual and wonderful.

ALASKA PENINSULA

It may be added that the large ocean steamers do not proceed beyond Seldovia, and that during the open season—from late March to early November—the north and west coasts of Cook Inlet (Turnagain Arm and Alaska Peninsula) are reached by small and somewhat irregular steamers.

The Alaska Peninsula has, indeed, at its northeastern extremity extended areas of lake country, with open valleys and great tundras; but its chief characteristic is the series of lofty volcanic peaks, which continue for a distance of more than 700 miles, from Redoubt southwest to Pogromni. Their sharp abruptness and rocky ruggedness dominate the landscape, the pointed summits being made more striking by the marshy valleys and dreary tundras at their bases, which break the continuity of the range into an irregular succession of isolated cones.

Here the land game, though caribou occupy the land, as shown by the map on the next page, gives way to the products of the sea chase. Unfortunately the palmy days of walrus hunting and otter catching are past, and there are scarcely a dozen permanent Esquimaux settlements on the more than 2,000 miles of indented coast along the peninsula. Belkofski, the former headquarters of the sea-otter and other fur trade, has lost its ancient glory and importance.

Nevertheless, the peninsula is an attractive, almost unvisited and unexploited field for the hunter, the naturalist, and especially for the lover of the unusual and beautiful in nature.

Several members of the Harriman Expedition, landing at Kukak Bay, on the north shore of Shelikof Strait,

MAP NO. 5—DISTRIBUTION OF CARIBOU AND MOUNTAIN GOATS

climbed to the top of the green slope back of their camp, and suddenly found themselves on the brink of an almost perpendicular mountain wall with a deep notch, through which they looked down 2,000 feet into a valley beneath invaded by a great glacier that swept down from the snow-white peaks beyond.

Burroughs, in "Summer Holidays in Alaskan Waters," adds:

> For nearly 2,000 miles we had seen mountains and valleys covered with unbroken spruce, cedar, and hemlock forests. Now we were to have 2,000 miles without a tree, the valleys and mountains as green as a lawn, chiefly of volcanic origin, many of the cones ideally perfect, the valleys deepened and carved by the old glaciers, and heights and lowlands alike covered with a carpet of grass, ferns, and flowers.

KODIAK ARCHIPELAGO

Among the islands of this group Afognak is interesting, as a fish-culture reservation and for its wooded areas, which caused it to be included in the Chugach National Forest. There are several hundred inhabitants, who have a large Greek chapel, some cattle, flocks of domestic fowl, and thriving vegetable gardens that supplement the usual means of livelihood by fishing.

Large, rugged, and commercially important, Kodiak is one of the most widely known of the Alaskan islands. It is the site of the first trading post; the scene of cruelty and repression as to its natives, and was first to have a church founded and a school opened. Kodiak lost its prestige when the headquarters of the Russian Company was transferred to Sitka. With its sea-otter catch sadly reduced and its population decimated by disease, Kodiak entered unpropitiously within the circle of American civilization, and long held to Russian ways and interests.

Its present population of nearly a thousand—Americans, Russians, Creoles, and Indians—live principally on fishing, though there are some few otter taken. Its Karluk River is the most famous salmon stream in Alaska, and its canneries afford the primary means of subsistence for the natives.

To many Americans the island is best known through its enormous beast, the great Kodiak bear—the largest species in the world.

Except on the eastern coast, the island is treeless, but its smooth, rounded hills are covered with luxuriant verdure. During the brief summer season the island is most beautiful, the emerald surfaces being brilliant with countless wild flowers in great variety. Cattle thrive; grain does not advance beyond the forage state; vegetables do well. Ample supplies for comfortable living are to be had from the large store of the Northern Commercial Company in the village. There is a fine church, and both the United States and the Greek Church maintain schools.

Burroughs alludes to the island as a pastoral paradise, and says of Kodiak:

> So secluded, so remote, so peaceful, such a mingling of the domestic, the pastoral, the sylvan, with the wild and rugged; such emerald heights, such flowery vales, such blue arms and recesses of the sea, and such a vast green solitude stretching away to the west and to the north and to the south! Bewitching Kodiak, the spell of thy summer freshness and placidity is still upon me.

CHAPTER XXIII

ALASKAN GAME

With material wealth, easy transportation, and improved fire-arms, civilized man has exploited the large game of the world during the past half century so mercilessly and persistently that many species are practically extinct. Among American game may be mentioned the buffalo on land, the sea-otter and the sea-lion on the ocean.

Devastation among the sea game of Alaskan waters has been enormous in amount and frightful in its results. Elliott states that in the seventy years prior to the cession of Alaska there were annually killed in its waters 10,000 walrus, which were the principal means of subsistence and of life of from seven to eight thousand natives. In forty years the whalers have practically annihilated the animal in Alaskan seas; the products, for the past ten years scarcely exceeding $10,000 annually, are now ended. There were shipped out of Alaska twenty walrus hides in 1906 and nineteen in 1907.

Of the effect on the natives of walrus exploitation J. N. Cobb, Assistant Agent Alaskan Fisheries, reports:

The white hunters rarely make use of anything but the two long curved tusks, which average about five pounds to the pair. If time permits, the flesh is boiled and the oil saved.

To many of the Esquimaux, especially on the Arctic shore, the walrus is almost a necessity of life, and the devastation wrought among the herds by the whalers has been, and is yet, the cause of fearful suffering and of death to many of the natives. The flesh is food for the men and dogs; the oil is used for food, for heating, and lighting; the skin makes a cover for the large skin boats; the intestines make water-proof clothing.

The commercial exploitation of other aquatic game, although not so destructive in its outcome, has been fatally successful. From 1881 to 1890, the average annual number of sea-otter caught was 4,784; in 1905, 61; in 1906, 28; and in 1907, 16 only. In similar periods the land-otter decreased from an annual average of 2,730 to 1,889, 1,709, and 1,393 respectively. The beaver from the catch of 6,094 annually fell off to 1,935 in 1905, 1,536 in 1906, and 1,159 in 1907.

The vast area of Alaska, its enormous number of large game, the difficulty of cross-country travel, and the expense of time and effort to hunt such game have been the principal factors in its past preservation.

It would require a volume by itself to consider game conditions in their general aspects, so that brief allusions are here made to the more important species only. These consist of bears, caribou, deer, moose, mountain goats, and mountain sheep.

Bears

Of the thirteen kinds of Alaskan bears recognized by scientists, the general public practically know only four general types: the brown bears, the grizzlies, the black bears, and the polar bears.

The belief that polar bears are numerous in Alaska is not justified by facts. They are very rarely found in the Bering Sea region, and are infrequent even on the Arctic coast, where they confine themselves largely to the polar pack, except when hibernating or when with young.

The grizzlies are of two varieties, whose habits are similar to those of the grizzlies of the United States. The Kenai grizzly has his habitat on the peninsula for which he is named, while the interior species is found most frequently in the Endicott, Nuzotin, and Alaskan Ranges, usually near the upper limit of timber.

Black bears roam over all Alaska south and east of the Yukon and Kuskokwim tundras. They are not of excessive size, though the largest of twelve, killed on the Alaskan Peninsula, had an unstretched skin seven feet nine and a half inches long. Quite shy, and their color frequently harmonizing with their environment, they are often located with difficulty. While the coast bears are mostly black in color, those of the interior are not infrequently of the cinnamon variety. Perhaps the most interesting species of this group is the so-called blue or glacier bear of the St. Elias Alps, which is very rarely seen and imperfectly known.

The most numerous and important group is that of the brown bears, which from their size and ferocity are widely known. They are the largest carnivorous animals in the world, being approached in size only by the polar bear and by their Kamchatkan relatives. Apparently the largest Kodiak bearskins known are of a Kidder variety, ten feet, and of a Dall variety, ten

feet two inches; there is, however, a stretched skin measuring thirteen feet.

The brown bear ranges almost exclusively in the coast region, and is found from extreme southern Alaska to the Alaska Peninsula and on islands adjacent thereto. They are not only terrifying from their size and great strength, but are, occasionally at least, dangerous to traveller as well as to hunter. They are great and skilful salmon fishers, though vegetarians and carnivorous when the salmon season is past.

The brown bears are divided by scientists into the following species: Kodiak bear, on Kodiak; the Dall and the Kidder bears, on Alaska Peninsula; Yakutat bear, in St. Elias region; Sitka bear, on Baranof Island; and Admiralty bear, on Admiralty Island.

Caribou

The caribou of Alaska are the only ones now found in the United States. Their habitat (see text map in Chapter XXII) is the reindeer-moss regions; largely the tundras and barren mountain ridges. Wherever man comes in numbers the unsuspicious caribou are speedily exterminated or driven away, for they are gregarious, are not keen-sighted, and display scant sagacity in eluding hunters. They keep to the open country and rarely enter timber, so that they are readily found and easily slaughtered. They suffer less from the antler-trophy hunters than from the meat hunters who supply mining camps and prospectors.

Mr. W. H. Osgood, in his excellent "Game Resources

Caribou Hunter Returning with Game.

of Alaska," from which many of these data are drawn, says of their migrations:

The great herds in the fall of the year perform a more or less regular movement in the nature of a migration, and within certain limits their course of travel and times of arrival at given points are well known. The best known of the large herds is the one which collects along the watershed between the Yukon and Tanana rivers. This herd still numbers from 1,000 to 3,000 or more animals, although levied upon annually by hunters from Fortymile, Eagle, Circle, and the mining towns on the Tanana River. Herds, perhaps equally large, range the little-known Arctic slope along the Endicott Mountains.

While hunters usually divide caribou into two general classes, woodland and barren-ground, scientists recognize three species: the Arctic, ranging in northern Alaska; the Grant, on Alaska Peninsula; and the Stone, on Kenai Peninsula.

Alaska Moose

Possibly the giant moose is the most interesting of the large game, for it is not only the largest land animal in America, but is also the largest member of the deer family in the world. The moose is of enormous size, and its weight sometimes exceeds 1,600 pounds. The average spread of their magnificent antlers is over five feet from tip to tip; there are many recorded spreads exceeding six feet, with a maximum example of six feet nine inches.

As is shown by the map on the next page, their range practically covers timbered Alaska, except in the south-

east. They are found in quite large numbers in the Yukon Valley, between Circle and Eagle, but are especially numerous on Kenai Peninsula, where favorable environment produces specimens of a size unequalled elsewhere.

Deer

The only Alaskan variety, the Sitkan deer, is exceedingly abundant in southeastern Alaska, where it

MAP NO. 6—DISTRIBUTION OF MOOSE AND DEER

inhabits the Alexander Archipelago (see preceding text map) and the adjacent mainland from the boundary north to Juneau. Slaughtered by the thousand in past years, the Sitkan deer now bids fair to hold its own under recent game laws.

Mountain Goats

This unique animal is rather of the chamois or antelope type than of the goat family. It has long, pure white hair, and the horns of both sexes are small, (from seven to ten inches in length), recurved, and blackish. Its range (see map in Chapter XXII) is almost entirely confined to the coast slopes of the mainland mountains, from Portland Canal north to the western spurs of the Chugach Mountains.

Osgood, in his interesting description, writes:

It lives almost entirely at high altitudes, frequenting steep cliffs, rock-walled cañons, and summits of an even more forbidding nature than those traversed by mountain sheep. To approach a mountain goat successfully is more a feat of mountaineering than of crafty hunting. To get above a white goat is in most cases to get to the ultimate heights.

Mountain Sheep

The pure white Dall variety is the only mountain sheep of Alaska. Especially a mountaineer, the white sheep is only absent from mountains in the vicinity of permanent settlements, whether white or native, and from the Alaska Peninsula and coastal fronts of the Alaskan range.

Of the hunt of the mountain sheep Osgood relates:

They are keen of vision and, unlike most game animals, depend little upon scent for warning of danger; but in spite of this it is no easy task to approach one of these alert, far-sighted animals on an open mountain-

side. To those physically equipped for it, hunting mountain sheep is unquestionably one of the greatest sports, and Alaska is one of the best fields for it in the world. To the inspiring and exhilarating joys of mountaineering are added the uncertainties and excitements of the chase.

HUNTING AND PRESERVATION OF BIG GAME

Of Alaska as a hunting ground Radclyffe writes:

From a sportsman's point of view the country is still a paradise, for big game of various kinds still abounds; and owing to the stringent game laws passed by the United States it appears to be well protected for many years to come.

Of his five months of hunting in western Alaska, Colonel Caine says:

The inducement was the fact that there was one of the finest natural hunting grounds in the world, and one not yet shot out. Was not the Kodiak huge bear the biggest of his species on earth, bar the polar bear? Was not the Alaska moose a veritable giant, with a spread of antlers averaging twelve inches more than his cousins of Canada? And further, was there not the white Alaskan sheep, the most graceful and beautiful of the big-horn family, though not the largest? Besides there were caribou, walrus, seals, sea-lions, wolves, and wolverines.

The preservation of Alaskan game has always been recognized as a subject of great public importance. As elsewhere stated Congress, in 1869, established the Pribilof reservation for the protection of the fur-seal,

and at intervals, too long it must be said, action has been secured to preserve other game. How great was the moral necessity of similar Congressional legislation appears in the brief allusions made in this chapter to the passing of the walrus.

A comprehensive law for the protection of game was passed in 1902, and regulations thereof were made in 1903 as to caribou, walrus, waterfowl, trophies, etc. The effect was practically nil as to walrus, and ineffective in many other ways.

The establishment of the great forest reserves in Alaska was beneficial, directly as well as indirectly, to game preservation, as, under Forest Regulations, No. 84, forest officials are charged to co-operate in the "enforcement of local laws for the protection of game."

A great advance was made in the law of May 11, 1908, which divided Alaska into two game districts, one north and one south of latitude 62°, with special seasons for each; establishing a non-resident hunting license, with fees of $50 for citizens of the United States and $100 for aliens, and resident and non-resident shipping licenses, ranging from $5 to $150; authorizing the governor to issue licenses, appoint wardens, establish regulations for the registration of guides, and fix the rates for licensing guides and the rates of compensation for guiding. (Stat. 60th Cong., 102.)

Under the law, game animals include deer, moose, caribou, mountain sheep, mountain goats, brown bear, sea-lions, and walrus; game waterfowl comprise ducks, brant, geese, swans, grouse, ptarmigan, and shore birds.

The Secretary of Agriculture is authorized to modify regulations according to necessities, and even to prohibit killing entirely for a period not exceeding two years. There are rigid regulations as to licenses, killing, sales, and exports. The salient features are as follows:

Licenses are granted by the governor, expire December 31; the cost to a non-resident is $50, to an alien $100. Each license has coupons authorizing the shipment of two moose (if killed north of 62°), four deer, three caribou (except from Kenai Peninsula until 1912), three mountain sheep, three goats, and three brown bear.

Close Seasons.—

North of latitude 62°:	
Moose, caribou, sheep . . .	Dec. 11–Aug. 1.
South of latitude 62°:	
Deer	June 1–Dec. 15.
Mountain goat	Feb. 2–Apr. 1.
Moose, caribou (see exception), sheep	Jan. 1–Aug. 20.
Brown bear	July 2–Oct. 1.
Grouse, ptarmigan, shore birds, waterfowl	Mar. 2–Sept. 1.
Exception: Caribou on the Kenai-Peninsula. To	Aug. 20, 1912.

Game animals or birds may be killed at any time for food or clothing by native Indians or Esquimaux, or by miners or explorers in need of food, but game so killed cannot be shipped or sold.

Export of Game Prohibited.—Deer, moose, caribou, sheep, goat, bear, or hides of these animals; wild birds, except eagles, or any parts thereof.

Exceptions: Specimens may be exported under restrictions imposed by the Secretary of Agriculture, and trophies of big game under licenses issued by the governor. Not more than one general ($40) license and two special ($150) moose licenses issued to one person in one year. Each shipper must file with customs office at port of shipment an affidavit that he has not violated the game law, that the trophy to be shipped has not been bought or purchased, has not been sold, and is not shipped for purpose of sale; that he is the owner of the trophy, and, in case of moose, whether the animal from which it was taken was killed north or south of latitude 62°.

Limits for Capture of Game.—Two moose, three each of caribou, sheep, and brown bears a season; twenty-five grouse, ptarmigan, shore birds, or waterfowl a day.

Guides.—They must be either American citizens or natives of Alaska, and have a certificate from the governor, who fixes their fees. The employment of a registered guide is obligatory on all hunting on Kenai Peninsula.

The reservations recently made for the protection of game birds and animals are mentioned in Chapter VI. By their establishment the United States has finally come to recognize officially that as a hunting region Alaska is scarcely surpassed on the western hemisphere, and that its vast game resources should be

so conserved as to yield a material income for many generations.

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CHAPTER XXIV

SCIENTIFIC FIELDS OF RESEARCH

With the material development of Alaska there have risen many questions in which a thorough knowledge of so-called purely scientific character has been of great economical importance. Researches as to climatic and geologic conditions, once discouraged by the Federal authorities in the Territory, are now pursued as indispensable to successful mining operations. As elsewhere mentioned the work of the United States Geological Survey has progressed with astonishing rapidity, owing to its recognized bearing on the exploitation of material resources, which thus elicits liberal governmental support.

The United States Bureau of Fisheries has also been able to add much relative to subjects allied to the duties which have devolved on it in connection with the great and remunerative industries over which it exercises a general and indefinite supervision. Similarly, the various bureaus of the Department of Agriculture have improved every opportunity to extend scientific knowledge of the vast and most imperfectly known regions of the Territory. Officers of the army, of the navy, of the Coast and Geodetic Survey, of the Census Bureau, and of the Revenue Marine Service, living up to the high standards of modern civilization,

have very materially contributed to the world's knowledge by investigating and reporting on all matters, though foreign to their duties, falling under their observation during Alaskan service.

It is obvious, however, that subjects pertaining to the domain of pure science have received scant support from the United States as regards Alaska.

It is not surprising, therefore, to know that the most extended scientific researches in Alaska have been those made independently of the Government. Reference is had to those made possible by the liberality and broad-mindedness of a well-known citizen, Mr. E. H. Harriman, whose private expedition of 1899 was accompanied by many distinguished scientific men as his guests.

The history of the Harriman Expedition has been published under the supervision of Dr. C. Hart Merriam, in volumes that are highly creditable to all concerned, whether viewed from the standpoint of typography, reproductions, its popular form, or the scientific treatment. In this work Professor Dall, in his valuable article of "Discovery and Exploration," says:-

> While the sublime scenery of the southern coast will long be the goal of tourists, we may confidently anticipate for years to come a rich harvest for the scientific explorers and naturalists whose good fortune may lead them to the fascinating study of the virgin north.

The Biological Survey, of the Department of Agriculture, has made biological reconnoissances of Cook

Inlet, 1900, Yukon River region, 1899, and base of Alaska Peninsula, 1902, and thus materially contributed to the previous scanty data as to fauna and flora of these almost unknown localities.

The investigations on the Alaska Peninsula were "important as a meeting ground of some of the life areas of the borders of the Hudsonian and Arctic zones." Here, also, is the only locality at which normally meet the Aleuts, the Esquimaux, and the Athapascans. The delimitation of the coniferous trees, and of the tundra areas, was supplemented by careful observation of the fauna, which disclosed the presence of 34 land mammals and 136 species of birds.

The Yukon reconnoissance resulted in an annotated list of 171 species of birds, and of 52 mammals, including a few noted in adjacent Canadian territory. Among these were 9 new species and subspecies of mammals, and 3 new forms of birds.

In the Cook Inlet region notes were made as to 24 mammals, 77 birds, and 1 batrachian. The future thorough examination of this region would doubtless add much, as the English hunter, Radclyffe, says:

> As a happy hunting ground for ornithologists I can recommend the valley of the Aniakchak River, since nowhere in Alaska did we find such a variety of sandpipers, waders, and ducks as frequent this region.

With innumerable demands on its funds, the Smithsonian Institution has given some attention to Alaska through the investigation of the fauna and flora of the early geological periods, especially of extinct animals.

Among the many attractions that the vast expanse of the Yukon watershed offers to students and lovers of nature, perhaps there is none more fascinating than the search for extinct mammals. The world's knowledge of remains of extinct vertebrates in Alaska began with Otto van Kotzebue's discovery, in 1816, of the remarkable ice-cliffs in Escholtz Bay, where teeth and bones of the mammoth were found. Similar discoveries were made in this region by Beechey in 1827–1828, by Seeman with Kellett in 1848, and by Dall in recent years. The remains thus found comprise the mammoth, the horse, bears, deer, and the musk-ox. From time to time trappers and prospectors have found similar remains at various points in the Seward Peninsula, thence north to the Point Barrow region, and east to the valleys of the upper Koyukuk and the central Yukon.

The scientific search for further remains has been prosecuted under the Smithsonian Institution by Mr. A. G. Maddren in 1904, and by Mr. C. W. Gilmore in 1907. The journey of Maddren proved most interesting. It involved small-boat travel on the Great River and its tributaries during the long summer period of starless nights, almost uninterrupted sunlight and balmy airs, amid such aspects of nature, varieties of experience and vicissitudes of camp life as are scarcely equalled elsewhere.

Maddren made a journey of nearly 300 miles through an unknown country, across the drainage basins of the Ungalik, Inglutalik, and Kobuk Rivers, starting from Kaltag on the Yukon. He was accompanied by an

assistant, with two Esquimaux packers and guides, though aided for fifty miles by two additional packers. Of his outfit he says:

The camp equipment for this trip was reduced to the minimum. It consisted of a tent made of balloon silk, weighing twelve pounds, measuring eight feet square on the floor, with a water-proof canvas ground cloth. A light robe made of four large caribou skins sewed together served as a common mattress for all, and a blanket apiece completed the bedding. Three kettles, a frying-pan, with a tin cup and spoon apiece, were all the utensils found necessary. The provisions carried, exclusive of the supplies required for the two additional packers, consisted of 150 pounds of flour, 30 pounds of rice, 30 pounds of beans, 60 pounds of bacon, 25 pounds of sugar, 3 pounds of tea, 2 pounds of baking-powder, and 2 pounds of salt. Seventy pounds to each man, or an average of $2\frac{1}{2}$ pounds per man per day. This supply, supplemented by a few fish and a number of ptarmigan shot from day to day, with a 22-calibre rifle, proved ample.

Of the fossil animals discovered in Alaska the most interesting is the Northern Mammoth, or fossil elephant, which evidently roamed, with the bison and the horse, through the entire watershed of the Yukon River, the Seward Peninsula, Kowak Valley, and the Kotzebue Sound region. The largest mammoth tusk is probably that found by Seeman, in 1848, at Escholtz Bay, which weighs 243 pounds: its base had a circumference of twenty-one inches, and though broken at the point its length was eleven feet six inches. It is possible that another tusk, which is twelve feet ten

inches long may be larger, while the Fort Gibbon imperfect tusk of ten feet four inches, though broken at both ends, may equal the two others in size. Several species of bison have been found, as also remains of the horse, musk-ox, reindeer, bear, and beaver.

ICE-CLIFFS

The ice-cliffs of Alaska are worthy of special scientific investigation, both on account of their remarkable formation and also to explain fully the phenomena, which have given rise to various differing opinions.

Their discoverer, Kotzebue, describes the ice-cliffs as Masses of the purest ice, of the height of a hundred feet, which are under a cover of moss and grass. . . . The covering of these mountains, on which the most luxuriant grass grows, is only half a foot thick, and consists of a mixture of clay, sand, and earth.

Beechey declared that Kotzebue was mistaken, and reported that the cliffs were not mainly ice, but were simply ice-faced.

Seeman, in 1848, justified Kotzebue's views, saying:

The ice-cliffs . . . are from forty to ninety feet high, and consist of three distinct layers. The lower layer is ice, the central, clay, containing fossils, and the uppermost, peat. The ice, as far as it can be seen, above ground, is from twenty to fifty feet thick, but is every year decreasing.

Hooper, in 1880, thought that both Kotzebue and Beechey were partly in error. W. H. Dall visited them the same year, 1880, and after careful examina-

Growing Forest on Malaspina Glacier, near Mt. St. Elias.

tion reports: "It appeared that the ridge itself, two miles wide and 250 feet high, was chiefly composed of solid ice overlaid with clay and vegetable mould." He adds: "It certainly remains one of the most wonderful and puzzling geological phenomena in existence."

In his explorations in 1884, Lieut. J. C. Cantwell discovered similar cliffs along the Kowak River, which he reports to be navigable for 375 miles. He says:

> Among the many novel and interesting features, none were more striking than a remarkable series of ice-cliffs observed along the banks of the river about eighty miles from the mouth. . . . One cliff measured by sextant angles showed 185 feet. The tops of the cliffs were superposed by a layer of black, siltlike soil from six to eight feet thick, and from this springs a luxuriant growth of mosses, grass, and the characteristic arctic shrubbery, consisting for the most part of willow, alder, and berry bushes, and a dense forest of spruce trees from fifty to eighty feet high and from four to eight inches in diameter.

FOSSIL PLANTS

The fossil flora of Alaska also offers wide, interesting, and almost untouched fields of investigation and exploration. F. H. Knowlton, United States National Museum, has shown that of 115 forms of fossil plants collected in Alaska, no less than 46 are peculiar to that region. Of the 64 having an outside distribution, 39 species are found in Greenland, Spitzbergen, and Sachalin Island, thus indicating synchronous deposits in the four semi-arctic regions. The family of oaks, chest-

nuts, etc., furnish 22 species, the conifers 18 species, and the willows 13 species. Practically every part of Alaska offers opportunities for extension of our knowledge of fossil plants.

There are few departments of science which would not profit by the work of specialists in the Territory. The language and customs of the vanishing natives, the determination of life zones of existing fauna and flora, the solving of glacial progression or withdrawal, —these and many other investigations would be most interesting, even if without practical bearing on material matters. It is to be hoped that more and more the inclinations and efforts of American scientists may be turned to Alaska, where important results may be expected and professional reputation may be gained.

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CHAPTER XXV

THE ALEUTIAN ISLANDS AND FOX FARMING

THERE is little known of the Aleutian Islands except as to the Fox Island group, adjacent to the Alaska Peninsula. From first to last their history has been one of exploitation since, in 1745, Michael Novidskof, in search of the sea-otter, reached Attu in his open frail craft. Fired by a cupidity that no danger could appall, other Russian traders pushed untiringly eastward in moss-calked, skin-sewn shallops, until the long line of Aleutian Islands, extending eastward nearly 800 miles, fell within their knowledge and under their rapacious control.

Some of these islands were then densely populated, aggregating in the early days nearly 30,000 natives, and their inhabitants throve on the sea-otter and other sea game. With rapacity and exploitation rampant they decreased with the vanishing game, and scarcely numbered 1,500 on the islands in 1900. Elliott tells us that in 1885 in the 800 intervening miles between Unalaska and the western boundary there were only three small native settlements—Umnak, 130, Atka, 230, and Attu, a few over 100 souls—in all less than 500 natives, with six or seven white men.

Indeed, the islands are neither attractive in their general appearance nor comfortable in occupation

for white men. It is a region of almost continual fog and clouds, with low summer temperatures and high winter winds. About one day of seven or eight is clear at Unalaska, while the island temperatures rarely exceed 65° in the warmest month (usually July), and fall to as low as from 10° to 22° in March. The whole group is treeless, except for a few stunted willows in sheltered ravines of the easterly and warmer islands. At Unalaska barely live a few spruces transplanted there in 1805.

As the islands are of volcanic origin their general features are bold peaks and rugged highlands, with narrow dividing passes at sea and deep valleys on land. Adjacent to the many extinct craters are numerous warm and hot springs, around which grow great quantities of moss, grasses, and berry-bearing shrubs.

Of the five larger islands of the Near group, Attu supplements its sea food by breeding foxes and making baskets, industries which produce money for the so-called necessities of modern life. More than 400 miles to the eastward is the next inhabited island, Atka, the most important of the thirty or more of the Andreanoff group. Although the intervening Rat group, between Attu and Atka, is not inhabited, yet its sea game is diligently sought by Atkan seafarers. Indeed, the hunters from Atka are among the most skilful and persistent of the Aleuts, and their women are scarcely second to those of Attu in their baskets and other work of woven grass. Following the modern tendency to aggregation, the Atkan natives have

assembled in one village, on the sheltered shores of Nazan harbor.

Of the Fox Islands, the easternmost Aleutian group, Unalaska is the largest and by far the most important. Dominated by the volcano Makushin, 5,961 feet, it is not quite so barren as the other Aleutian islands to the west, and its fiord-indented shores and volcanic-ridged valleys are picturesque to the eye. Its principal town, Iliuliuk, is more generally known as Unalaska, and with the adjacent Dutch harbor has served as a port of call for the early Nome shipping, and all other craft doing business in Bering Sea.

In olden times the headquarters of the Russian Church and the centre of the fur-trade, Unalaska yielded slowly and reluctantly to American influences, which are to-day fully recognized. Gradually it attracts to it the drifting natives, as shown by the increase of population from 317 in 1890 to 428 in 1900.

FOX FARMING

Unwise exploitation has very greatly reduced the fur-bearing productivity of the land animals of the Aleutian Islands, as well as of the interior of Alaska. With the early extermination of foxes in prospect there was organized about 1894 the Semidi Propagation Company to domesticate and raise foxes on uninhabited islands. The original fox farm was stocked from the Pribilof group located on North Semidi Island, whence the industry has extended to thirty or more islands to the eastward, far the greater number being situated

in Prince William Sound, though there are seven in the Kodiak group. Most of the islands are occupied under lease from the United States, and the law excepts from homesteading the fox islets. Two companies and several individuals have followed this industry, which has been only moderately successful from the financial standpoint. Considerable investment is necessary, it takes at least four years before any revenue is obtained, the life is most isolated, and skins are not very productive, usually varying in value from $10 to $20, according to quality and demand. In some instances natives have become fox breeders, and where private parties are so engaged they have supplemented their fox breeding by fishing, farming, or lumbering.

The largest fox farm is at Long Island, near Kodiak, where there are nearly 1,000 blue foxes. The largest number of skins comes, however, from the Pribilof group, where about 700 foxes are annually taken by the natives, supplementary to the fur-seal catch. These foxes are not domesticated.

The very valuable silver-gray fox is too thoroughly savage to accept conditions necessary for profitable fox breeding, and, in consequence, fox farming is confined almost entirely to the blue fox. The fox is monogamous, and an average of four foxes come to maturity from each litter. It is necessary to feed the foxes the greater part of the year, and careful supervision is essential to their successful raising.

The blue fox thrives wild on the extreme easterly isle of Attu, and from that point several of the Shu-

magin islands, Chernabura, Simeonof, etc., have been stocked with moderate success. The extension and development of this industry is desirable as one of the much-needed means to enable the Aleuts successfully to meet changed conditions of Alaskan life.

LAND FURS

Due doubtless to the extreme value placed on certain aquatic furs, there have obtained exaggerated ideas regarding the financial importance of the fur trade of the interior of the Territory. Hitherto there has been no authoritative statement regarding this trade, but through the courtesy of the Northern Commercial Company, extended through its vice-president and general manager, M. L. Washburn, the writer has obtained data extending from 1871 to 1908.

In these thirty-eight years there have been obtained 2,809,577 skins having an aggregate value of $8,039,186; an average of $2.86 per skin. The general trend of the trade appears from the following:

Years	No. of skins	Value per skin	Total value
1871–1880	505,980	$3.16	$1,596,494
1881–1890	1,062,138	2.22	2,360,115
1891–1900	871,464	2.68	2,335,862
1901–1908	369,995	4.72	1,744,715
Totals	2,809,577	$2.86	$8,037,186

The five years of greatest productivity in number of skins were: 1894, 138,684; 1884, 149,804; 1892, 157,636; 1885, 157,749. There has been only one year

since 1896—1901 with 114,995 skins—that the number has exceeded 60,000. The present average may be placed at about 36,000 skins, though the hunt of 1908 marketed 45, 202 skins. The values per skin have varied from $1.61 in 1883 to $7.71 in 1902; since 1897 the value has fallen below $3 in one year only. The increase in values is a natural sequence to the overtrapping, which in the ten years ending with 1893 produced not less than 1,255,616 skins.

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CHAPTER XXVI

THE CANADIAN KLONDIKE

This famous gold-producing district owes its development to the discovery of rich placers on Bonanza Creek in August, 1896, by G. W. Cormack, and by Henderson on Gold Bottom Creek.

The extreme richness of the ground attracted immediately thousands upon thousands of gold seekers, whose tragic toils, sufferings, and endurance made historic the mountain passes of Chilkoot, Chilkat, and White, as well as the lakes and rapids of the upper Lewes and Yukon, through which they descended by rudely built boats to Dawson, at the confluence of the Klondike and the Yukon.

The construction of the White Pass Railway, 1898 to 1900, from Skagway to the foot of the dangerous White Horse Rapids, and the establishment of a connecting line of steamers thence down the Yukon, make the journey of to-day one of delightful pleasure, surrounded by modern comforts, through regions of picturesque beauty, and past many incipient settlements where hunting, fishing, and agriculture are the principal means of subsistence. Trains run between Skagway and White Horse, over the White Pass Railway, every week-day throughout the year, and well-furnished boats leave White Horse for Dawson about three times

a week, from May to September. The traveller usually passes a night at White Horse, a thriving frontier town.

The journey is made from Seattle to Dawson in about eight days in summer and twelve days in winter. The downward voyage from White Horse is made in less than two days, and the upward trip from Dawson in less than four days. Winter travel between White Horse and Dawson is by four-horse sleighs over a well-built trail of 330 miles, and is made in six days, travel being by day only.

Dawson is the capital of Yukon Territory, and is the social, financial, and trade centre of the Klondike and other adjacent mines. It passed long since from the status of a mining camp to that of a modern city. It has churches, schools, libraries, hospitals, banks, clubs, assay offices, telephones, electric lights, power plants, newspapers, and water-works. The commissioner, governor by courtesy, here supervises the executive functions of government, the judiciary administers justice, and the well-known Northwest Mounted Police efficiently preserve the public peace, enforce the laws, and arrest the criminals, of whom, contrary to oft-expressed opinions, there are few and those of the minor order.

The Klondike mining district includes the basins of the Klondike, Indian, and McQuestion Rivers, an area of about 800 square miles. The mines in the Bonanza precinct, distant from twelve to fifteen miles from Dawson, are reached by stage or by the Klondike Mines Railway.

The very rich placers are practically exhausted, and

White Horse Rapids on the Lewes (Upper Yukon) River.

(The rapids so much dreaded by the Klondike pioneers.)

the low-grade gravels have very largely passed under the control of large corporations, which are adopting the most efficient and economical systems of exploitation. Extensive ditches have been constructed, the best modern machinery imported, and systematic, carefully planned methods of placer mining are now in operation. The practical wisdom of such policy is evidenced by the increase in the output for 1908, which materially exceeded that of 1907. Dawson has decreased in population in late years, and but for systematic mining with machinery its decadence would have been much greater and speedily culminated in a deserted district. It now looks forward to an era of moderate prosperity.

The days of extraordinary bonanzas, whereby the laborer of yesterday became a wealthy man of to-day, have passed, and the Klondike is no longer a poor man's country.

Of Klondike mining, Brooks said several years since:

It was the exploitation of these almost fabulously rich and relatively shallow gravels that brought the Klondike gold output up with a bound, and it is their quick exhaustion that has caused an almost equally rapid decline of the annual yield. There are still extensive bodies of lower-grade gravels to mine in the Klondike, but these can be developed only by means of extensive water conduits or by dredging. Mining in the Klondike has passed its zenith, whereas in Seward Peninsula the maximum yearly output is still to be reached.

The Canadian Government has endeavored to restore the early prosperity of the Klondike by aiding

in the construction of long and expensive ditches, and by fostering the extension of local and through railway lines. Unsuccessful efforts were made to launch a project for the building of about 1,800 miles of railway from Langham, Sasketchewan, via the Athabascan and Peace River valleys. The only hope of such a railway being financially successful rests on the wheat and cattle of the intervening country between Langham and Dawson.

The history of mining in the Klondike shows that there were scarcely five years of extreme prosperity. The following yields are given by Mr. E. H. Brooks: 1896, $300,000; 1897, $2,500,000; 1898, $10,000,000; 1899, $16,000,000; 1900, $22,275,000; 1901, $18,000,000; 1902, $14,500,000; 1903, $12,250,000; 1904, $10,000,000; 1905, $7,300,000; 1906, $5,600,000; 1907, $5,000,000, and 1908, about $5,100,000.

Astonishing as was the productivity of the Klondike mines in their palmiest days, they ranked second in richness to the placers of California, which in two years (1851 to 1853) yielded $62,000,000 as against $40,275,000 for the best two years of the Klondike output.

There is yet a very large amount of business done with Dawson, not only for Canadian territory but also for the Alaskan trade. All steamboat travel or freight in the early spring or late autumn for the Tanana Valley or the upper Alaskan Yukon is necessarily via Dawson and the White Pass Railway. Although all baggage is examined in passing to and from Alaska, yet such examinations are almost invariably free from disagreeable features. In the fields of transportation

there have been several energetic and efficient American competitors, both for Dawson trade and also as the controlling force in Alaskan business. In fact, it was an American firm that first met the crying needs of the Klondike miners, and saved them from direst distress. This was the Alaska Commercial Company, which did not long hold the field undisputed, as it was speedily followed by several other American companies of high standing. The Alaska Company consolidated with several others a few years since, and the firm is now known as the Northern Commercial Company. This company, and the North American Transportation and Trading Company, practically handle all freight and passengers for the Alaskan Yukon, the Koyukuk and Tanana regions; in short, all below the International Boundary near Eagle, about 100 miles below Dawson.

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CHAPTER XXVII

TRADE AND TRANSPORTATION

PROBABLY there is no practical phase of Alaska that is so little known as that of transportation in and out of the Territory, whether it be of mail or telegram, of passenger or freight. As illustrative of the ignorance regarding these matters may be mentioned an experience of the writer as he was about to visit Seward Peninsula. An official of high rank, looking over a map of Alaska, broached the point of what would be seen in passing through Valdez *en route* to Nome. He was astonished to be told that at Valdez one was a thousand miles farther from Nome than when he left Seattle.

STEAMSHIP LINES

The principal ocean steamships in the Alaskan trade are those of the long established Pacific Coast Company, of the vigorous Alaskan Steamship Company, and a foreign line, the Canadian Pacific Navigation Company. Service is frequent, reasonably rapid, and disasters are rare.

The Pacific Coast Company plies fortnightly during winter, and weekly during summer, between Seattle and Skagway. It also runs during June, July, and August an excursion steamer to the glaciers and other

points, taking only first-class round-trip passengers for the eleven-day voyage. It operates tri-monthly steamships to Nome in summer—June to September.

The Alaskan Company has a weekly service between Seattle and Skagway in summer, and a twelve-day service in winter. It sends in summer a boat to Nome about every ten days. Its fleet of twelve steamships is most busily engaged in its weekly service to Prince William Sound—the voyage to Cordova taking five days, to Valdez six days, and to Seward a week.

The Canadian service to Skagway usually starts from Vancouver, and there are about three boats per month in summer.

ROUTES OF TRAVEL

There is but one starting point for Alaska—Seattle; and there are three direct and sharply differing routes to various regions—to southeastern Alaska, to southwestern Alaska, and to Seward Peninsula.

To southeastern Alaska are the steamship lines that run, through the Inside Passage, to Skagway, touching at Ketchikan, Wrangell, and Juneau regularly, and occasionally at other ports. The through voyage lasts from four to five days in all seasons, and the first-class fare is $30.[1]

Southwestern Alaska (from Cordova westward to Seward) is reached by direct steamers in five to eight days, and the first-class fare is $45. The ports thus reached are Cordova, Valdez, and Seward, with calls

[1] Fares given are, of course, liable to change.

at adjacent ports occasionally. This region is also reached from Seattle via Juneau and the Inside Passage by three or four boats each month, in ten to twelve days; some steamers run through, and in other cases a change at Juneau is necessary. The boats from Juneau touch at Sitka, Yakutat Bay, Cordova, Orca, Valdez, Seward, and occasionally at other points, as far west as Seldovia. At Valdez there is a connecting steamer about the middle of each month, that runs to the Cook Inlet ports, and to Kodiak, ending its voyage at Unalaska (Dutch Harbor). In summer it runs beyond Unalaska to Bristol Bay.

Seward Peninsula and adjacent regions are reached direct only during the open season of four months, from early June to early October. In the open season this ocean voyage of 2,740 miles is made in eight to ten days, the first-class fare being from $75 to $100, according to accommodations; second-class, $65; steerage, $35. Steamers leave Seattle from about June 5 to October 5; and they return from Nome from about June 20 to October 15. In 1908 there were seventy-four steamers which arrived and cleared at Nome during the season.

Winter travel in and out of Seward Peninsula lasts from early November to the beginning of April. It commences only with frozen streams and ends with the break-up of the rivers in the Tanana and other southerly valleys. The route is via Valdez, which is an open winter port in frequent and regular communication with Seattle; first-class fare, $45. Travel between Valdez and Fairbanks, 354 miles, is by com-

fortable tri-weekly stages, the journey occupying from seven to ten days; fare $150. Between Fairbanks and Fort Gibbon (Tanana), about 160 miles, public conveyance by stage, horse, or dog team can often be had, but occasionally recourse must be had to private dog team. Between Fort Gibbon and Nome, about 598 miles, one must nearly always depend on private dog team, and look to a journey of twenty to thirty days at an expense of $200, or more. The cost of such a journey, between Seattle and Nome, will run from $500 to $750, according to one's knowledge of the country, trail-endurance, and accommodations required. There are comfortable road houses along the entire route from Valdez to Nome, and the journey entails no great hardships, apart from exposure to great cold and exhaustion by fatigue in following the dog team from Nome to Fort Gibbon.

In summer the Yukon, Koyukuk, and Tanana Valleys are reached by complex routes. Travel, by the all-American route, is via ocean steamer to Nome and St. Michael, and thence by river boats. These river boats leave St. Michael about twice a week from June 20 to about September 20, and arrive at St. Michael on their return from about June 10 to the end of September. There are only two or three boats each summer up the Koyukuk, but the entire Yukon Valley, and the Tanana Valley as far as Fairbanks, can be speedily reached throughout the entire open season by boats running weekly or oftener.

Fort Gibbon (Tanana) at the mouth of the Tanana, is the transportation centre of interior Alaska. Here

the Fairbanks traffic connects with that of the Yukon Valley, and much freight with many passengers transfer to and from connecting steamboats from Dawson or St. Michael. In 1905 not less than 224 steamers touched at Fort Gibbon during the open season of five months. In 1906 the number of steamboats was 216, and in 1907 about 200—the tendency being to reduce steamers and increase the number and capacity of the freight-bearing barges that they carry in tow.

The Canadian route is followed for travel in or out of the interior valleys very early in the spring (May), or in the early autumn (middle of September to October). One must journey by steamboat to or from Seattle, via the Inside Passage to Skagway, thence by rail to White Horse, and down the Yukon by steamer to Dawson, where one catches the Dawson-Fairbanks line of American steamboats, which touch at Eagle, Circle, Rampart, and Fort Gibbon (Tanana). While there is an average of four boats a week from White Horse, the service from Dawson to the Tanana is less frequent, about twice a week.

TRADE

The development of the resources of Alaska has not been unmarked by corresponding benefits to the United States in general, and to the Pacific Coast in particular. Economic writers have frequently and potently set forth the great importance of the trade of the Orient as an indispensable factor in the future prosperity of this nation, and none will gainsay the soundness of

their reasonings. Meanwhile there has sprung into existence an Alaskan trade which is simply enormous in its extent—time and circumstance considered.

Statistics are wanting as to this trade prior to 1903, when official reports began. In that year the exportations from the United States to Alaska aggregated $9,987,164, which was considered by many as an extraordinary and inflated business, inviting disaster. In four years, however, the trade has more than doubled, the total importations reaching the value of $19,536,965 in 1907.

Doubtless there are many who will learn with surprise that, as shown by the Statistical Abstract of the United States, 1908, the exportations from the United States to Alaska in 1907 aggregated $18,402,765, which is nearly one-half of our exportations to the Empire of Japan that year, and more than seventy per cent. of those to the Chinese Empire.

When considered with relation to the trade of our insular possessions in the Pacific, the comparisons are distinctly favorable in trade importance to Alaska, whose total importations in 1907 exceeded those of Hawaii by $1,000,000, and were over eighty-two per cent. of the total imports of the Philippine Islands. Realizing that the greatest financial benefits inure to the country that both produces and ships, the Alaskan trade, from this standpoint, is by comparison startlingly beneficial to this country, as the exportations from the United States to Alaska nearly equalled the combined domestic exportations to both Hawaii and the Philippine Islands. The exportations

from the United States in 1907 (Statistical Abstract for 1907) to the three countries were as follows: Philippine Islands, $5,155 359; Hawaii, $14,435,725, and to Alaska, $18,402,765. Relative to total importations, foreign and domestic, the percentages were: Philippines, seventeen per cent. from the United States; Hawaii, seventy-eight per cent.; and Alaska, ninety-four per cent.

It may be added that the Alaskan trade demands neither special methods of manufacture nor of packing, and that it deals only in the best of merchandise, as the question of freight charges enters so largely in the cost to the consumer. All shipments are carried in vessels of American register, an additional advantage to our national interests.

"The Monthly Summary of Commerce," for December, 1908, shows the character of shipments into Alaska during 1908 to be as follows: Foodstuffs in crude condition and food animals, $1,455,381; foodstuffs, partly or wholly manufactured, $4,326,947; crude materials, for use in manufacturing, $358,991; manufactures for further use in manufacturing, $1,892,867; manufactures ready for consumption, $7,141,908. The three leading classes were, in round numbers, iron and steel manufactures, $3,400,000; meat and dairy products, $2,000,000; breadstuffs and vegetables, $1,152,000. As elsewhere stated the trade in vegetables has been seriously affected by the agricultural development of the Territory. The decrease from 1906 to 1908 of about sixteen per cent. in the shipment of distilled spirits incidentally illustrates

the settled and permanent conditions of modern Alaska, which is very far from being a land of wild dissipation and irregular life.

Nome has the largest direct shipments (by ocean), which have been as follows: 1903, $1,726,242; 1904, $1,988,520; 1905, $2,922,082; 1906, $3,740,188; 1907, $2,428,440. The trade of Fairbanks has rapidly increased, the records showing: 1903, $81,968; 1904, $441,705; 1905, $1,789,312; and in 1907, the year of the strike, $2,152,412. It may be added that much now goes into Fairbanks via Valdez.

TRADING COMPANIES

Although the Alaskan trade is no longer a monopoly, yet it is practically controlled in the interior by several large corporations. The oldest and best known of these is the Northern Commercial Company, which, founded in 1868, was the pioneer of Yukon trade and navigation. For twenty years, as the Alaska Commercial Company, it was the lessee of the Pribilof seal islands, but it now practically confines its operations to the trade of the Yukon watershed. Its local headquarters at St. Michael command the admiration of every Alaskan. At that point are operated a shipyard, hotel, general store, warehousing, machine and repair shops, a laundry, and, of all things, a cold-storage plant—for the imported fresh meat. There are complete facilities for the handling and transfer of the thousands of tons of freight that are necessarily transshipped here to the river steamboats navigating the interior waters. The Com-

pany's Yukon fleet consists of 32 stern-wheel, light-draft, mostly oil-burning steamboats; and 35 freight-carrying barges, which are towed by the steamboats. In addition to the great plants and warehouses at St. Michael, Tanana, Dawson, and Fairbanks, they operate large trading stores at Bettles on the Koyukuk, at Delta on the Tanana, and at Eagle, Circle, Rampart, Kokrines, Nulato, and Andreafski on the Yukon, having at the last-named place winter quarters for some of their boats and reserve depots of stores.

Second in the field was the North American Trading and Transportation Company, whose activities are mainly displayed in the Klondike trade at Dawson, the Tanana trade at Fairbanks, and on the upper Yukon from Eagle to Tanana (Fort Gibbon). The amount and variety of the stocks carried by these companies are matters of surprise to Alaskan tourists, whose needs and comforts are thoroughly and reasonably subserved by them throughout interior Alaska.

PRICES IN THE INTERIOR

The following retail prices drawn from a Fairbanks paper indicate the cost of living, which is estimated to be $2.50 per day in Fairbanks, where laborers receive about $7, miners $7.50, and mechanics $15 per day. Prices in cents per pound or can: 10 cents for salt, 15 for beans, sugar, and soap; 20 for lard, fresh potatoes, and fresh onions; 25 for bacon, most evaporated fruits, pilot bread, ham, and pork; 25 for salmon, jams, and jellies per can; 50 for keg butter, canned meats,

canned vegetables, and canned fruits; 75 for coffee, tea, cocoa, and per dozen eggs; $1 for honey and canned butter, and (gallon) coal oil. Fresh beef, mutton, veal, and pork run from 30 to 60 cents per pound, but fresh chicken and the best fresh veal and pork are 75 cents per pound. At remote mining camps prices run from 100 to 300 per cent. above those at Fairbanks, according to the remoteness and size of camp.

MILITARY TELEGRAPH SERVICE

This service reaches nearly all places of size in the Territory, and speedily serves almost every important permanent industry as well as the promising mining camps. The only extended areas that are without a telegraph are Cook Inlet, Alaska Peninsula, the Kuskokwim watershed, the Yukon Delta, the Point Barrow region, and the Koyukuk Valley. These areas are comparatively unimportant, as seventy-five per cent. of the white population of Alaska are within an hour of a cable, a telephone, or telegraph office, so that at will they can speedily communicate with their friends of the outside world. Less than ten per cent. of the settled whites are fifty miles distant from such service.

The cables from Seattle reach, through Sitka and Valdez, every important Alaskan port from Ketchikan to Seward, on Kenai Peninsula. The connecting land lines from Valdez extend northeast to Eagle, there connecting with the Dawson system, and northwest to Fairbanks, Tanana, and St. Michael, while wireless sections reach Nome, Circle, and Eagle. Supplement-

ary private systems of telephone reach all the large mining camps near Nome and in the Fairbanks region, while there are connecting railroad systems at Seward, of the Alaska Central, and at Cordova, of the Copper River Railway.

General G. M. Randall suggested the land lines for military purposes, and to Secretary Root is due the credit of the first cable system—to Skagway. The line of the army built the land lines under the supervision of technical experts of the Signal Corps.

While the entire responsibility for route, construction, equipment, installation, and operation rested by law on the writer, then Chief Signal Officer of the army, the enterprise would have dragged for years but for the far-seeing and helpful policy of Mr. Root, one of the great American War Secretaries.

Special difficulties—practical and theoretical—demanded unusual energy and high professional skill from the field workers. In solving these problems, on which the completion and operation of the system depended, high credit is due to Colonel (now General) James Allen, and to Major Edgar Russel, for the construction, equipment, and installation in a practically uncharted ocean of the longest American cables ever laid—aggregating over 3,000 miles, more than enough to cross the North Atlantic. Similar credit is due Captains G. C. Burnell, G. S. Gibbs, and William Mitchell, for line location and construction under Arctic conditions through hitherto unknown areas of Alaska. Finally Captain L. Wildman equipped, installed, and operated a wireless system—largely of his own invention—between St.

Michael and Nome, the first commercial, long-distance, and regularly operating wireless system in the world—now in its sixth year of continuous and uninterrupted service.

The Congressional appropriations for these lines aggregated $1,352,132, and about $1,000,000 additional was involved in the army transportation used, and in the pay, clothing, and subsistence of the soldiers engaged in the construction, operation, and maintenance of the lines. Despite difficulties inherent on work in a practically unknown environment, the system was built, without either deficiency or additional appropriation, from the sums originally estimated.

Failure was freely forecast, the scheme being impracticable, and if built its expenses would swamp the Treasury: fortunately neither prediction was verified. Its value to the Government has been enormous, which before saw local officials in Alaska absolutely without restraint. A telegraph to Nome in 1900 would have saved the American nation a sorrowful chapter in its practically stainless record as to the Federal judiciary.

Commercial business was equally difficult to control, extravagant in its expenses, often inadequate, dilatory, and inefficient. The lines were thrown open to commercial business, to the advantage of the nation, of the Territory, and of the individual. The business done, astonishing even to optimists in its amount, best indicates the value of the system.

The writer was derided for estimating a possible revenue of $100,000 annually, and the receipts for 1903, $1,934.32 were viewed as large. The last fiscal year,

however, they amounted to $205,210, and to June 30, 1908, have aggregated $901,316.

It is not infrequently said that corruption is rife in the public service, especially in Alaska. Let it be noted that these telegraph tolls, of nearly a million of dollars, have in their entirety passed through the hands of American soldiers—enlisted men—and the total loss by embezzlement is but $361.69. This insignificant loss was through a sergeant—who deposited $75 the day he deserted—who was receiving $1.50 per day for doing the telegraphing and accounting for about $18,000 a year of tolls received; this in a town where skilled workmen were paid $15 per day, and laborers $8 to $9 per day.

MAIL FACILITIES

Though neglected for many years as to its postal needs, and largely dependent on the Canadian facilities via Dawson, Alaska is now most liberally provided with mail service. The mails for the interior and northwestern Alaska are necessarily irregular of delivery during the months of April, May, and October, when travel is most difficult pending the formation of the autumn ice and of the spring break-up.

Southeastern Alaska and the coast from Yakutat to Seldovia are well cared for during the entire year. Alaska Peninsula and Unalaska receive a monthly mail by coast steamers running west from Valdez, or Seward, starting about the middle of each month; this service is extended during the salmon season to the Bering sea-coast at Nushagak. In winter the Kuskokwim

regions are supplied by the monthly mail carried overland from Cold Bay, Shelikof Straits, from November to April. A similar winter service runs from Kenai north to Hober.

The summer mails for Seward Peninsula, the Yukon, Koyukuk, and Tanana Valleys go direct to Nome by steamer during the four months of open season—June to early October—and those for the interior are forwarded from St. Michael by steamboat. For the rest of the year these valleys are served by the great triweekly mail from Valdez to Fairbanks, thence weekly to Tanana (Fort Gibbon) and Nome. From this through route radiates winter service for all exterior points of importance. The upper Koyukuk Valley has a monthly winter service to and from Tanana from October to May. There is a similar monthly service for the Yukon Delta and Kuskokwim country, from Koserefski.

The Arctic Ocean region as far as Point Barrow has two mails during the winter, to and from Kotzebue; and the Kobuk Valley a monthly mail from November to May.

TABLES

TABLE NO. 1.—DATES OF HISTORICAL INTEREST

1648. Deshneff, rounding Asia, navigates Bering Strait.
1731. Gwosdeff discovers the Alaskan coast.
1741. Bering discovers St. Elias region.
1761–1762. Pushkaref winters on Alaskan Peninsula.
1778. Cook traces north coasts to Icy Cape.
1783. First permanent settlement—on Kodiak Island.
1792. Baranoff, Director of the Colonies.
1799. Russian-American Trading Company, chartered; granted monopoly for twenty years, renewed 1821 and 1844. Trading posts and missions established at Sitka and elsewhere.
1802. Tlinkits practically annihilated the Russian garrison at Sitka.
1804. Sitka again occupied and fortified.
1816. Kotzebue, discovering Kotzebue Sound, reaches Cape Krusenstern.
1824. Convention between Russia and the United States regarding boundary, fishing, trading, and navigation. Similar treaty between Russia and Great Britain in 1825.
1825. Father Veniaminof begins his missionary work, establishing a school at Unalaska; made a bishop in 1834.
1826. Beechey discovers Point Barrow, northernmost cape of Alaska.
1831. Baron Wrangell, Director of the Colonies.
1832. Lukeen built redoubt on Kuskokwim, named for Kolmakof, who explored the river in 1820.
1833. St. Michael trading post established.
1837. Simpson completes northern coast-line by connecting Return Reef (Franklin, 1826), with Point Barrow.
1838. Nulato occupied as trading post.
1847. Hudson Bay Company descends the Porcupine and builds Fort Yukon.
1848. American whaling established north of Bering Strait.
1850. Beginning of cattle breeding at Kodiak and Cook Inlet.
1855. Rodgers explores Arctic Ocean to 72° 05′ N.
1862. Russian-American Company refused renewal of charter in 1862.
1863. Lukeen ascends (first) the Yukon to Fort Yukon.
1865. Kennicott commences exploration of Yukon for Western Union Telegraph Company.
1867. Russia cedes Alaska to the United States for $7,200,000. United States Army takes possession, establishing posts at Sitka, Tongass, and Wrangell.

1868. United States custom, revenue, and navigation laws extended to Alaska.
1869. Alaskan Commercial Company initiates steam navigation on the Yukon.
1871–1880. Dall surveys Alaskan waters and Bering Strait.
1873. Gold discovered in southeastern Alaska (Treadwell and Juneau).
1877. United States troops withdrawn from Alaska, leaving control to United States Navy and Revenue Marine Service.
1881. 1883. International polar station at Point Barrow, and system of meteorological stations established by Signal Corps, United States Army.
1885. Laws of Oregon extended to Alaska by Congress. Administrative and judicial officers authorized; mining, educational, and other legislation enacted.
1885. Allen explored Copper, Tanana, and Koyukuk regions.
1893. International conference at Paris established sixty-mile limit for pelagic fur-seal fishery.
1896. Gold discovered in Yukon region. Gold discovered in Tanana Valley.
1897. United States Army returns to Alaska.
1899. Gold discovered in Nome region.
1900. Alaska granted civil government, with judicial and other officials and institutions.
1900. 1904. United States Military Telegraph System built and installed; consisting of cables from Seattle via Sitka to Skagway, from Sitka to Valdez, and Valdez to Seward and Cordova; of over 2,300 miles of land lines from Valdez via Fairbanks and Fort Gibbon to St. Michael, and from Valdez to Fort Egbert (Eagle); and of wireless system from St. Michael to Safety Harbor, near Nome.
1906. Alaska granted representation in Congress, through a delegate.
1899. Modus Vivendi between United States and Great Britain fixed provisional boundary between Canada and Alaska, on Lynn Canal.
1903. Alaskan Boundary Tribunal defined the Alaskan boundary from Portland Canal to the 141st meridian.
1904. Survey begun of boundary under decision of Alaskan Boundary Tribunal.
1906. Convention between Great Britain and the United States provided for surveying and marking the 141st meridian; survey thereof begun.

TABLE No. 2.—MEAN TEMPERATURES, IN DEGREES FAHR.

Stations	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Interior.												
Copper Center	—14	—2	14	29	45	53	55	53	42	29	5	—6
Fort Gibbon	—18	—7	9	24	45	59	59	54	36	20	3	—14
Fort Yukon *	—31	—11	4	22	37	59	64	54	43	17	—7	—24
Dawson (Canada)	—20	—15	2	27	45	57	60	55	42	27	—2	—8
Fairbanks	—19	0	12	31	49	51	57	55	41	25	2	—11
Coast.												
Point Barrow	—21	—13	—10	—2	21	36	39	38	31	13	—2	—16
St. Michael	7	—2	9	20	33	46	54	52	44	30	16	5
Unalaska	34	30	33	35	40	46	50	50	46	40	35	33
Valdez	20	22	25	34	43	50	51	49	44	37	25	23
Sitka	34	33	37	42	47	52	54	57	52	46	40	36

* Broken record, combined with Dall River.

TABLE No. 2 (*Continued*).—PRECIPITATION, RAIN AND MELTED SNOW, IN INCHES

Stations	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Interior.													
Copper Center	0.70	0.41	0.32	0.12	0.56	1.06	1.45	1.08	1.02	1.20	0.80	0.59	9.31
Fairbanks	1.98	0.44	1.38	0.35	0.36	1.20	2.16	2.01	1.32	0.95	0.66	0.78	13.59
Fort Gibbon	0.55	0.43	0.46	0.11	0.50	0.74	2.80	3.04	1.05	0.64	0.53	0.63	11.48
Dawson City.....	1.02	0.62	0.27	0.56	0.60	1.00	1.97	1.79	1.44	1.20	0.74	1.19	12.40
Fort Egbert.....	0.63	0.56	0.54	0.56	0.68	1.26	2.13	1.75	1.21	1.14	0.62	0.43	11.51
Coast.													
Fort Liscum	7.51	5.52	5.04	3.19	3.07	2.74	5.90	7.95	9.10	9.73	6.53	6.51	72.79
St. Michael	0.86	0.18	0.45	0.69	0.99	1.40	1.75	2.62	2.90	1.34	0.79	0.67	14.64
Unalaska.....	13.81	7.68	6.48	7.51	4.49	4.26	2.78	3.40	8.64	11.98	9.30	11.81	109.34
Sitka	9.75	10.51	10.02	6.24	4.94	3.58	5.28	6.93	11.09	13.49	13.68	10.11	111.72
Point Barrow	0.16	0.35	0.28	0.31	0.25	0.37	1.17	1.26	0.54	1.13	0.54	0.26	6.62

TABLE No. 3.—GOLD PRODUCTION, BY DISTRICTS

(From Bulletins, U. S. Geological Survey)

Year	Pacific Coast Belt	Copper River and Cook Inlet Region	Yukon Basin	Seward Peninsula	Totals
1880	$20,000	.....	.....	.....	$20,000
1881	40,000	.....	.....	.....	40,000
1882	150,000	.....	.....	.....	150,000
1883	300,000	.....	$1,000	.....	301,000
1884	200.000	.....	$1,000	.....	201,000
1885	275.000	.....	25,000	.....	300,000
1886	416,000	.....	30,000	.....	446,000
1887	645,000	.....	30,000	.....	675,000
1888	815,000	.....	35,000	.....	850,000
1889	860,000	.....	40,000	.....	900,000
1890	712,000	.....	50,000	.....	762,000
1891	800,000	.....	100,000	.....	900,000
1892	970,000	.....	110,000	.....	1,080,000
1893	838,000	.....	200,000	.....	1,038,000
1894	882,000	.....	400,000	.....	1,282,000
1895	1,569,500	$50,000	709,000	.....	2,328,500
1896	1,941,000	120 000	800,000	.....	2,861,000
1897	1,799 500	175 000	450,000	$15,000	2,439,500
1898	1,892,000	150,000	400,000	75,000	2,517,000
1899	2.152.000	150.000	500 000	2,800,000	5,602,000
1900	2 606 000	160 000	650 000	4,750,000	8,166,000
1901	2,072.000	180 000	550,000	4,130,700	6,932,700
1902	2,546 600	375 000	800,000	4,561,800	8,283,400
1903	2.843.000	375,000	1,000.000	4,465,600	8,683,600
1904	3,195,800	500,000	1,300,000	4,164,600	9,160,400
1905	3,430.000	500.000	6,900,000	4,800,000	15,630,000
1906	3,454,794	332.000	10,750.000	7,500,000	22,036,794
1907	2,891,743	275.000	9.183.000	7,000,000	19,349,743
1908	3,410,000	400,000	10,190,000	5,100,000	19,100,000
Totals	$43,726,937	$3,742,000	$45,204,000	$49,362,700	$142,035,637

TABLE No. 4.—FUR-SEAL SKINS OBTAINED FROM ALL WATERS OF ALASKA, 1868 TO 1908

(From Documents of Bureau of Fisheries)

Year	From seal islands		From pelagic and other sources		Total	
	Number	Value	Number	Value	Number	Value
1868	140,000	$700,000	4,367	$8,734	144,367	$708,734
1869	85,901	644,258	4,430	8,860	90,331	653,118
1870	23 773	166,411	8,686	21,715	32,459	188,126
1871	102,960	1,544,400	16,911	40,586	119,871	1,584,986
1872	108,819	1,218,774	5,336	12,806	114,155	1,231,580
1873	109,117	1,418,421	5,229	20,886	114,346	1,439,307
1874	110,585	1,448,663	5,825	49,513	116,410	1,498,176
1875	106,460	1,357,365	5,033	45,297	111,493	1,402,662
1876	94.657	828,249	5,515	28.954	100,172	857,203
1877	84,310	822,023	5,210	31,260	89,520	853,283
1878	109,323	1,071,365	5,540	38,780	114,863	1,110,145
1879	110 511	2,340,713	8,557	111,241	119,068	2,451 954
1880	105,718	2,347,687	8,418	117,852	114,136	2,465,539
1881	105,063	2,086,193	10,382	80,979	115,445	2,167,172
1882	99,812	1,357,443	15,581	79,463	115,393	1,436,906
1883	79,509	1,606,082	16,587	104,498	96,096	1,710,580
1884	105,434	1,340,096	16,971	114,554	122,405	1,454,650
1885	105,024	1,491,341	23,040	149,760	128,064	1,641,101
1886	104,521	1,788,335	28,494	199,458	133,015	1,987,793
1887	105,760	1,480,640	30,628	235,836	136,388	1,716,476
1888	103,304	2,014,370	36,389	283,834	139,693	2,298,204
1889	102,617	1,744,489	29,858	291,116	132,475	2,035,605
1890	28,859	1,053,354	40,814	620,403	69,673	1,673,757
1891	14,406	432,180	59,568	938,196	73,974	1,370,376
1892	7 509	225,270	46,642	792,914	54,151	1,018,184
1893	7,390	199,530	30,812	385,150	38,202	584,680
1894	15,033	318,176	61,838	541,083	76,871	859,259
1895	14,846	300,631	56,291	576,983	71,137	877,614
1896	30,654	521,118	43,917	351,336	74,571	872,454
1897	19,200	297,600	24,332	158,158	43,532	455,758
1898	18,047	288,752	28,552	185,588	46,599	474,340
1899	16,812	437.112	34.168	350,222	50,980	787,334
1900	22,470	719,040	35,191	563,056	57.661	1,282,096
1901	23,066	770,848	24,050	366,763	47,116	1,137,611
1902	22,182	721,175	22,812	439,131	44,994	1,160,306
1903	19,292	566,754	27,000	499 500	46,292	1,066,254
1904	12,960	388,800	11,523	232,140	24,483	620,940
1905	12,723	508,920	12,660	253,200	25,383	762,120
1906	14,476	445 137	15,581	*311,620	30,057	756,757
1907	14,964	*475,107	18,816	*376,320	33,770	851,427
1908	15,430	*459,950	18,151	*363,020	33,581	822,970
Total	2,533,497	39,946,772	909,705	10,380,765	3,443,202	50,327,537

* Estimated.

TABLE No. 5.—GLACIERS

(C=Cook Inlet. G=Glacier Bay. H=Holkam Bay. L=Lynn Canal. M=McKinley Range. P=Prince William Sound. S=St. Elias Range. W=Wrangell Group.)

NAMES AND LOCALITY

Adams (G).
Agassiz, Louis (S).
Allen, Henry T., Headwaters of Tanana.
Alsek, on Alsek River.
Amherst (P).
Annin (P).
Atrevida (S).
Augusta, Mrs. I. C. Russell (S).
Auk.
Bainbridge (P).
Baird, Spencer F., on Thomas Bay.
Baird, on Lowe River.
Barry, Thomas H. (P).
Bering, Vitus J., on Controller Bay.
Bertha (L).
Black (S).
Blackstone (P).
Brady, John G., Taylor Bay.
Brown (H).
Bryn Mawr (P).
Caldwell, Kichatna River.
Cantwell, Delta River.
Cañon Creek, now Shoup.
Carrol, James (G).
Cascade, near Valdez.
Cascade (S).
Cascade (P).
Casement, R. L. (S).
Castner, Joseph C., Delta River.
Cataract (P).
Chamberlain, F. M. (S).
Charpentier (G).
Chesnina (W).
Chetudiná (W).
Chickaloon (C).
Childs, George W., Copper River.
Chisana (W).
Cola (S).
Columbia, formerly Freemantle (P).
Copper, source Copper River.
Corbin, Henry C., near Valdez.
Crescent (P).
Crillon, near Mt. Crillon.
Culross (P).
Cushing, Henry P. (G).
Dadina (W).
Daisy (S).
Dalton, now Turner.
Davidson, George (L).
Dawes, Henry L. (H).
Dawes, No. 2 (H).
De Blondeau (L).
Dirt (G).
Dirt, now Mud.
Doroshin, Peter P. (C).
Duffield, now Turner.
Dying (G).
Eagle (L).
Fairweather, Kakhegina River.
Fassett, H. C. (S).
Ferebee, Nelson M. (L).
Fidèle (M).
First, now Popof.
Fleischmann (M).
Flood, Stikine River.

Foster, now Taku.
Frederika, Mrs. Schwatka, Skolai Creek.
Freemantle, now Columbia.
Galiano, Don D. A. (S).
Garrison (L).
Gates (W).
Geike, Archibald (G).
Girdled (G).
Goodwin, Copper River.
Grand Pacific (G).
Grand Plateau, Alsek Delta.
Granite Cañon (G).
Great, Stikine River.
Great Bering, Icy Bay.
Grewingk (C).
Guyot, Arnold (S).
Hanna (M).
Harriman, Edward H. (P).
Harvard (P).
Harvey (M).
Hayden, Ferdinand W. (S).
Hayes, Charles W., Hayes River.
Herbert, Hilary A. (L).
Herron, Joseph H. (M).
Hidden (G).
Hogback, near Valdez.
Hubbard, Gardiner G. (S).
Hugh Miller (G).
Irene (L).
Jacksina (W).
Johns Hopkins (G).
Kadischle, native name for Norris.
Ka-ra-kai, now Flood.
Kennicott (W).
Klutina, Klutina River.
Klutlan, Klutlan River.
Kluvesna (W).
Knapp (L).
Knik (C).
Kushtaka, near Controller Bay.
Kuskulana (W).
La Perouse, near Icy Cape.
Le Conte, Joseph, Le Conte Bay.
Leslie, head Chilkat River.
Libbey, William, Jr. (S).
Little, now Popof.
Long (W).
Lucia, Mrs. Kerr (S).
McBride (G).
Makushin, Unalaska.
Malaspina (S).
Martin River, Controller Bay.
Marvine, Archibald E. (S).
Matanuska, Matanuska River.
Meade, Richard W. (L).
Mendenhall, Thomas C., near Juneau.
Miles, Nelson A., Copper River.
Miller, Cyrus R. (S).
Morse, J. F. (G).
Moser, Jefferson F. (S).
Mountain, Thomas Bay.
Mud, Stikine River, formerly Dirt.
Muir, John, Muir Inlet (G).
Muldrow, Robert (M).
Nachgelssit, Klehini River.
Nadina (W).
Newton (S).
Nizina, Nizina River.
Norris, Basil, Taku Inlet.
Nunatak (S).
O'Connor, Alsek River.
Orange (S).
Patterson, Carlile P., Frederick Sound.
Peters, now Hanna.
Popof, formerly First, or Little, Stikine River.
Portage, Kenai Peninsula.
Radcliffe (P).
Rainbow (L).
Regal (W).
Reid, Harry F., Reid Inlet.
Rendu (G).
Roaring (P).
Rodman, Hugh (S).
Rohn, Oscar, Nizina River.
Russell, Skolai Pass.
Saksaia (L).
Sawyers, No. 1 (H).
Sawyers, No. 2 (H).
Schulze, now Taku.
Serpentine (P).
Seward (S).
Sheridan, Philip H., Copper Delta.

Shoup, near Valdez.
Slope, Controller Bay.
Small, Frederick Sound.
Smith (P).
Soule, Portland Canal.
Southeast, now Adams.
Southern, Cook Inlet.
Spurr, Josiah E., near Skolai Pass.
Sitkaje, now Davidson.
Stairway or Surprise (P).
Summit, near Le Conte Bay.
Sumner, now Turner.
Sundum (H).
Surprise or Stairway (P).
Taku, Taku Inlet.
Talkeetna (C).
Tana, Tana River.
Tanana, 62° N., 142° 30′ W.
Tazlina, Tazlina River.
Thunder, now Le Conte.
Toboggan (P).
Turner, John H. (S).
Twin, Taku Inlet.
Twin (G).
Twins, now Harvard and Yale.
Tyndall (S).
Valdez, Valdez.
Vassar (P).
Villard, Henry (L).
Washington, now Barry.
Wedge (P).
Wellesley (P).
White (G).
Wimbledon, now Brady.
Windom, now Norris.
Wood, C. E. S. (G).
Woodworth, Jay B., Tasnuna River.
Worthington, near Valdez.
Wossnessenski, Elias G. (C).
Wright, George F., Taku River.
Yakutat (S).
Yale (P).

TABLE No. 6.—MOUNTAINS AND VOLCANOES

Name and Locality	Height in feet	
Akutan, Akutan Island	4,100	Active volcano.
Amukta, Amukta Island	3,738	Volcano, inactive since 1791.
Augusta, St. Elias Range	13,918	
Blackburn, Wrangell group	16,140	
Bogoslof	900	Active volcano. See p. 169.
Carlisle, Carlisle Island	7,500	Volcano, inactive since 1800.
Castle Peak, Wrangell Mountains	10,314	
Cleveland, Chuginadak Island	8,150	Volcano, inactive since 1838.
Cook, St. Elias Range	13,788	
Crillon, Fairweather Range	15,900	
Dagelet, St. Elias Range	9,708	
Dall, McKinley Range	9,000	
Devil's Thumb, Frederick Sound	9,077	
Drum, Wrangell group	12,002	
Edgecumbe, Sitka	3,467	Volcano, emitted smoke in 1796.
Fairweather	15,292	
Foraker, McKinley Range	17 100	
Gareloi, Gareloi Island	5,334	Volcano, inactive since 1838.
Gordon, Wrangell group	9,100	
Grewingk, Bogoslof Islands	900	Active. See p. 169.
Hayes, McKinley Range	14,000	
Herbert, Herbert Island	5,291	Volcano, inactive since 1800.
Hubbard, St. Elias Range	12,064	
Huxley, St. Elias	11,907	
Iliamna, Cook Inlet	12,066	Active
Irving, St. Elias	9,000	
Jarvis, Wrangell group	12,230	
Kagamil, Kagamil Island	....	Volcano, inactive since 1838.
Kates Needle, on Stikine	9 960	
Kimball, south of Tanana River	9,000	145° W. longitude.
Kliuchef, Atka Island	....	Volcano, inactive since 1838.
Korovin, Atka Island	4.988	Volcano, inactive since 1844.
La Perouse, Fairweather Mountains	10,470	
Lituya, Fairweather Mountains	1 832	
Logan, St. Elias Range	19,539	
Makushin, Unalaska Island	5 691	Volcano.
McKinley	20,300	At headwaters of Kuskokwim.
Newton, St. Elias Range	13,744	
Pavlof, Alaska Peninsula	....	Active volcano.
Pogromni, Unimak Island	6,500	Volcano, inactive since 1831.
Redoubt, Cook Inlet	11,270	Active volcano.
Regal, Wrangell group	13,400	
Russell, McKinley Range	11,350	
St. Elias	18,024	
Sanford, Wrangell group	13,500	
Schwatka, Yukon Valley	9.000	In 66° N., 146° W.
Seattle, St. Elias Range	10,000	
Sergief, Atka Island	....	Volcano, inactive since 1812.
Shishaldin, Unimak Island	9,387	Volcano.
Sitkin, Little Sitkin Island	5.033	Most westerly volcano (inactive).
Spurr, McKinley Range	10,925	
Tulik, Umnak Island	....	Volcano inactive.
Vancouver, St. Elias Range	15 666	
Vsevidof, Umnak Island	8.800	Volcano, inactive since 1790.
Wrangell	14 005	Volcano, Copper Valley, 62° N.
Yunaska, Four Craters Islands	2,684	Volcano, inactive since 1830.
Zanetti, Wrangell group	12,980	

TABLE No. 7.—SALMON AND COD FISHERIES, 1868 TO 1908

(From "Fisheries of Alaska," by U. S. Bureau of Fisheries)

Year	Cod Fishery		Salmon Fishery			Value
	Vessels	Value	Salted value	Canneries	Canned cases (48 1-lb. cans)	
1868	14	$202,138	$16,000	..	.....	.....
1869	8	92,880	13,600	..	.....	.....
1870	10	82,258	14,400	..	.....	.....
1871	6	64,008	6,300	..	.....	.....
1872	3	25,200	9,000	..	.....	.....
1873	4	39,600	7,200	..	.....	.....
1874	4	27,432	11,200	..	.....	.....
1875	4	42,336	9,600	..	.....	.....
1876	6	54,576	14,400	..	.....	.....
1877	7	45,000	15,700	..	.....	.....
1878	9	78,700	16,800	2	8,159	.....
1879	10	83 520	28,000	2	12,530	.....
1880	5	43,350	29,600	1	6,539	.....
1881	3	44.550	15,840	1	8,977	.....
1882	9	63,480	53,010	3	21,745	.....
1883	9	88,440	65,259	6	48,337	.....
1884	5	98 250	54,954	7	64,886	.....
1885	8	79,290	29 070	6	83,415	.....
1886	7	83,370	43,749	9	142,065	.....
1887	6	71,550	35,802	10	206,677	.....
1888	6	59 847	85 500	16	412,115	.....
1889	4	39 150	58 013	37	719.196	.....
1890	4	57 868	162,351	35	682,591	.....
1891	8	93,793	71,304	30	801,400	.....
1892	6	118,080	140,057	15	474,717	.....
1893	6	109,440	120,083	22	643,654	.....
1894	5	80,460	176,060	21	686,440	.....
1895	6	76,290	85,404	23	626,530	.....
1896	9	76,440	65,198	29	966,707	.....
1897	10	127,800	110,936	29	909,078	.....
1898	10	122,550	181,360	30	965,097	.....
1899	11	206,550	167,865	32	1,078,146	.....
1900	10	218,550	238,890	42	1,548,139	.....
1901	10	180,480	171,339	55	2,024,269	.....
1902	12	269,760	212,688	64	2,545,298	.....
1903	13	261,240	223,368	60	2,249,137	.....
1904	16	261,316	89,209	55	1,953,746	.....
						* $59,668,771
1905	21	181,224	143,811	42	1,907,967	6,304,671
1906	..	110,907	139,838	47	2,246,989	7,896,392
1907	..	146,372	240,549	48	2,202,100	8,781,366
1908	..	134,775	352,707	50	2,606,972	10,185,783
Total	.....	.....	.....	.....	.....	$92,836,983

* The value of salmon canned prior to 1905 is estimated at $3 per case.

TABLE No. 8.—PRODUCTS OF ALASKA FROM 1868 TO 1908

Year	Land Furs	Aquatic Furs, including fur-seal	Fishery Products		Minerals
			Salmon	All others	
1868.....	.....	*$1,154,979	$16,000	$290,638	.....
1869.....	.....	1,099,363	13 600	263,030	.....
1870.....	.....	634,371	14,400	249,248	.....
1871.....	†$61,012	2,022,541	6,300	168,968	.....
1872.....	281,838	1,669 135	9,000	156,400	.....
1873.....	127,478	1,876 852	7 200	94,000	.....
1874.....	129,149	1,935,731	11,200	104,982	.....
1875.....	135,931	1,840,217	9 600	128,046	.....
1876.....	189,503	1 294 758	14 400	216 801	.....
1877.....	150,340	1,290,838	15.700	107 000	.....
1878.....	149,394	1,547,700	41 272	143 150	.....
1879.....	171,200	2,889.509	65 590	180 809	.....
1880.....	200,651	2,903,094	52,517	126,683	.....
1881.....	152,664	2,690,377	42,771	125 237	.....
1882.....	128,952	1,960,111	118,245	138,866	.....
1883.....	179,148	2,233 785	210 270	257,422	.....
1884.....	269,710	1,977 675	249 612	250,533	.....
1885.....	256,217	2,164 126	279,315	248,364	.....
1886.....	266 134	2,510,818	469 944	276,242	.....
1887.....	288,604	2,240 501	655,833	261 174	.....
1888.....	232,185	2,821,229	1.321 845	125.633	.....
1889.....	291,940	2,558 630	2,215 601	137 051	.....
1890.....	294,562	2,196,782	2,210,124	150,376	‡$4,686,714
1891.....	265,010	1,456,601	2,475,504	281,238	916,920
1892.....	286,768	1,104,409	1,565,019	219,491	1,096,000
1893.....	387.294	570,905	2,041,045	281,263	1,048,570
1894.....	383,235	945,274	2,235,380	251,472	1,305,257
1895.....	367,615	963,389	1,964,994	158,113	2,386,722
1896.....	227,432	958.679	2,966,519	154,325	2,980,087
1897.....	144,048	541,983	2,866,630	266,346	2,538,241
1898.....	81,372	560,545	3,182,457	247,072	2,585.575
1899.....	45,724	873,559	3,404 653	344,457	5,703,076
1900.....	147,363	1,368,321	4,917,065	386,229	8,238,294
1901.....	243,784	1,174,778	6,247,961	437,301	7,007,398
1902.....	240,589	1,197.473	7 851,534	458,770	8,400,693
1903.....	287 013	1,203,421	7 059 252	445 993	8,941,614
1904.....	126,829	659,107	5,967,577	491,008	9.567,535
1905.....	182,326	§994,350	5,972,370	‖1,935 873	16,478,142
1906.....	108,949	†820,358	8,166,373	488,272	23 375,008
1907.....	231.747	†785 359	9,166,008	560.746	20,887 055
1908.....	323,480	†700,000	10,671,651	768,664	19,929,800
Total...	$8,039,186	$62,392,083	$96,772,381	$12,377,286	$147,972,701

Grand total..... $327,553,637

* For following periods aquatic furs, other than fur-seal, have been equally distributed, on data from United States Bureau of Fisheries, as follows: 1868–1870, $1,338,735; 1871–1880, $4,375,551; 1881–1890, $5,232,050; 1891–1900, $862,250; 1901–1904, $148,668. †Estimated. ‡ 1880 to 1890 inclusive. § Includes hair-seal, $194,442, 1868–1905, which cannot be distributed. ‖ This includes the following values, which cannot be distributed to the proper years: Halibut, 1890–1905, $921,562; whalebone and oil, 1868–1905, $583,328.

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MAP NO. 7.—MAP OF ALASKA SHOWING RAILWAY ROUTES CONSIDERED BY ALASKA RAILROAD COMMISSION (SUBMITTED TO CONGRESS BY THE PRESIDENT IN 1913)

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